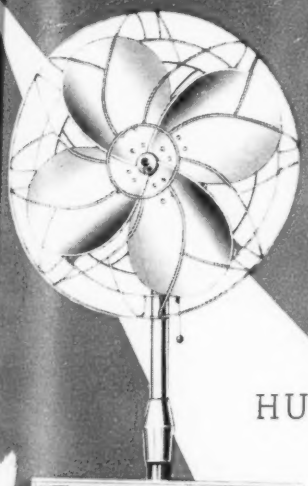
SEPTEMBER, 1939

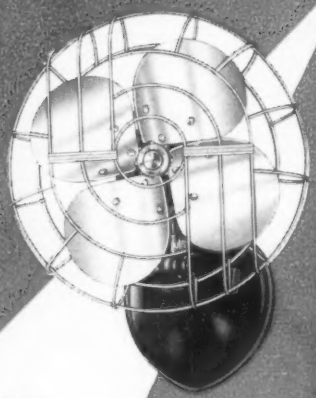
ELECTRICAL SOUTH



HUNTER will soon begin its 53rd season in the exclusive production of finest quality fans and ventilators.

With this long background of experience HUNTER engineers have lately perfected a complete line of new model attic and commercial coolers.

HUNTER will continue to furnish its thousands of hotel customers only the best.



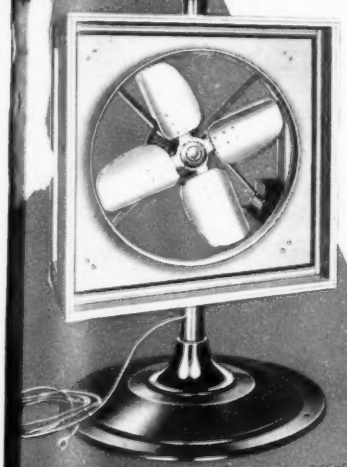
HUNTER FAN & VENTILATING CO., INC.

Factory: FULTON, N. Y.

General Sales Offices: Memphis, Sterick Bldg. *Eastern Sales Office:* New York, 92 Warren Street

Sales Offices:

DALLAS PHILADELPHIA BOSTON DETROIT
NEW ORLEANS PITTSBURGH WASHINGTON
CLEVELAND ATLANTA CHICAGO ST. LOUIS



HUNTER Century

HOTEL NOBLE..
JONESBORO ARK

..HOTEL HAYNE
WALTERBORO SC

Why Is Youngstown The Largest Manufacturer Of Conduit In America? - - -

You men who buy and use Buckeye Conduit know the answer! You know it in terms of fast installation and uniform performance when working a series of bends with the hickey. You know what no back lash means to a man trying hard for a neat job. You know what time and money are saved when threads come clean on the first cut and need no chasing. But do you know why Youngstown Conduit does all these things?

The answer lies in control -- of a specialty. We make hundreds of tons of conduit, but we treat it as the *particular* product it should be. The ore is especially selected at our own mines. Processing is as careful as for the most difficult alloys. Inspection at every possible point in our mills gives you the performance on the job that you know you can count on with Buckeye Conduit. Buy Youngstown Buckeye Conduit -- to make faster time, to keep up schedules, to make more money on your contracts.

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon and Alloy Steels

General Offices - YOUNGSTOWN, OHIO

Ask your distributor for Youngstown Conduit - Pipe and Tubular Products - Sheets - Plates - Tin Plate - Bars - Rods - Wire - Nails - Tie Plates and Spikes

26-9B

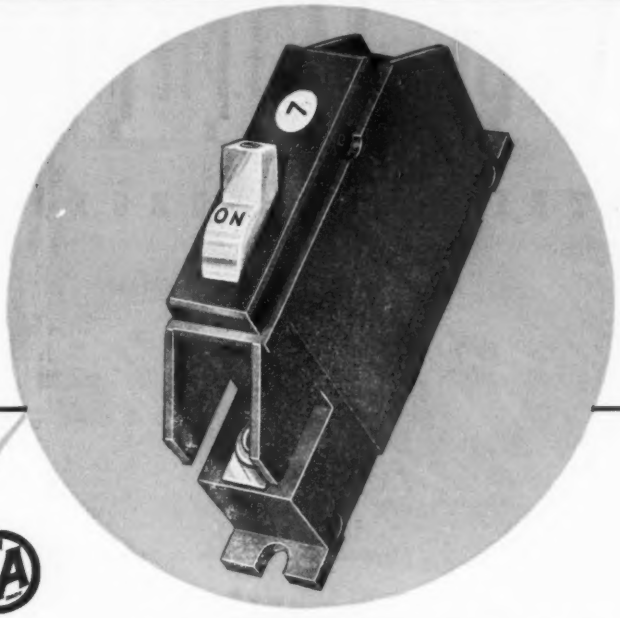
BUCKEYE TRADE MARK YOUNGSTOWN CONDUIT

YOUNGSTOWN

Easy.. ..

TO CHANGE CIRCUIT CAPACITIES . . . .

Changes in Branch Circuits made by removing only two screws and inserting another breaker of the required capacity . . . Saves time . . . Avoids delays.



(FA) Type AC CIRCUIT BREAKER

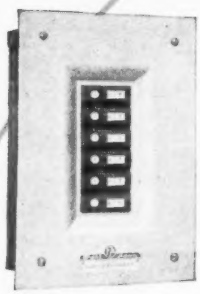
The heart of (FA) Service Equipment, Load Centers and Panelboards —this New (FA) Type AC Circuit Breaker offers the following advantages:

Positive Automatic Protection . . . The new (FA) Type AC Circuit Breaker cannot be held closed or blocked to prevent automatic opening on short circuit or sustained overload. The mechanism trips free from the handle. This means positive, automatic protection . . . Because of proper time lag characteristics, needless circuit interruptions are prevented when momentary overloads occur.

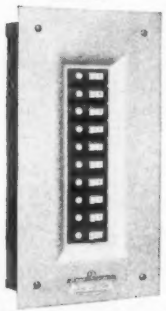
Operation — Convenience . . . On short circuit or sustained overload, the breaker quickly opens the circuit . . . This moves the handle from the "ON" to the "OFF" position . . . Service can be quickly restored by manually returning the handle to the "ON" position . . . There is no intermediate position of the handle.

Capacities . . . 15 to 50 amp., inclusive — single and double pole, individual trip — 120 volts AC.

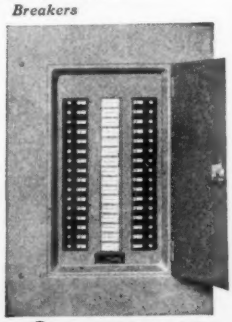
Send for Bulletin No. 58 . . . Frank Adam Electric Co., St. Louis, Mo.



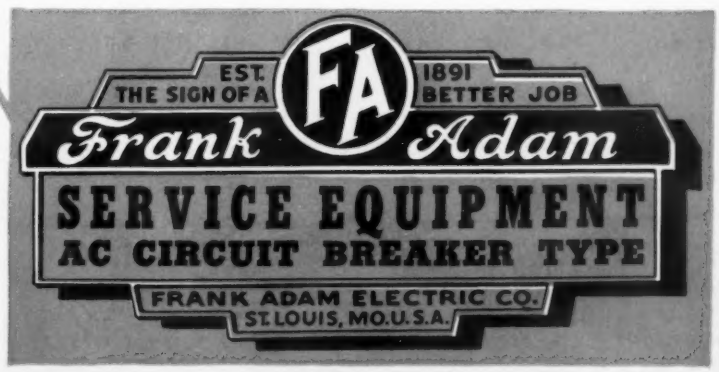
(FA) Panelboard — 32 Single Pole (FA) AC Circuit Breaker Branch Circuits



(FA) Service Equipment with D. P. 50 Amp. AC Circuit Breaker Main and 6 S. P., AC Circuit Breakers



(FA) Load Center—16 Single Pole (FA) AC Circuit Breaker Branch Circuits



ARVIN

ELECTRIC FAN-FORCED

Circulating Heater

JUST THE THING TO SELL

CIRCULATES HEAT—employing efficient fan-distributing principle used in modern home heating systems.

PLUGS INTO ANY AC WALL OUTLET—heats air quickly, warming room all over.

SAFE WITH CHILDREN—because heating element and fan are enclosed. Won't burn rug even if upset accidentally.

EFFICIENT CONSTRUCTION—with air-intake louvers and quiet-running fan, behind heating element, to drive heat off wires and out into room.

for:

Bathrooms
Nurseries
Dens
Guest-rooms
Game-rooms
Sun-rooms
Trailers
Camp Cottages
Small Offices
Ticket Booths

For Baby's Bath and other uses where extra or temporary heat is needed.

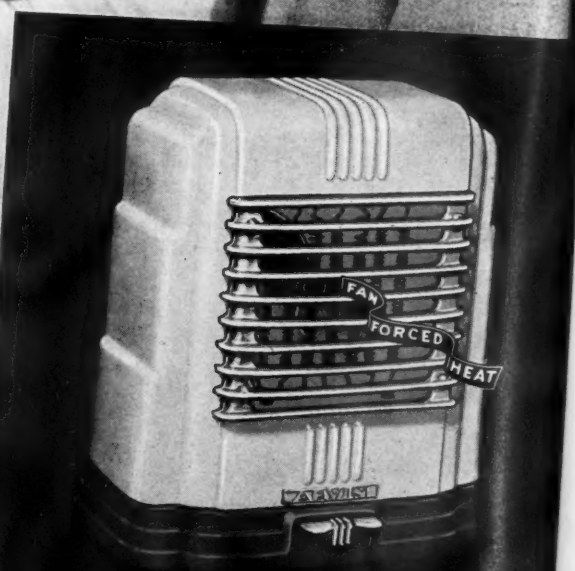
● Advertising in Good Housekeeping, American Magazine, Better Homes and Gardens starts next month. Order your stock of Arvins from your jobber now.

NOBLITT-SPARKS INDUSTRIES, INC., COLUMBUS, INDIANA
Also Makers of Arvin Car Heaters and Radios

Tested and Approved — 1936 — Good Housekeeping Institute — GOOD HOUSEKEEPING MAGAZINE

STANDARD MODEL 101
Two-tone Green Enamel Finish. Chrome Grille.... $6.95 LIST
Size of case—10" high, 9¾" x 6½" at base

JUNIOR MODEL 50
Green Morocco Finish. Streamline Design..... $4.95 LIST
Size of case—7½" high, 6¼" wide, 10" deep



DELUXE MODEL 201A—Ivory and Maroon Enamel Finish, Chromium Grille..... $9.95 LIST
Size—11¾" high, 10⅜" x 6½" at base

DELUXE MODEL 201—Tan and Brown Morocco Finish, Chromium Grille..... $8.95 List

Two Deluxe models are identical except for finish. Toe switch makes it easy to turn heater on and off. Red indicator light, inside case, gives "fireplace glow" when heater is on—warns against leaving it on.

All Prices Slightly Higher Denver and West—Also in Extreme South.

SEPTEMBER, 1939

Volume 19 No. 9

ELECTRICAL SOUTH

J. C. MARTIN, Manager
W. E. COOGLER, Production Manager

Editorial and Business Offices
GRANT BUILDING
ATLANTA, GEORGIA

MEMBER OF A. B. P.
MEMBER OF A. B. C.

ANNUAL SUBSCRIPTION—$1.00
THREE YEARS—$2.00
CANADA—$1.50; FOREIGN—$2.00

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W. S. CUSHION, 506 The Arcade, Cleveland, Ohio.
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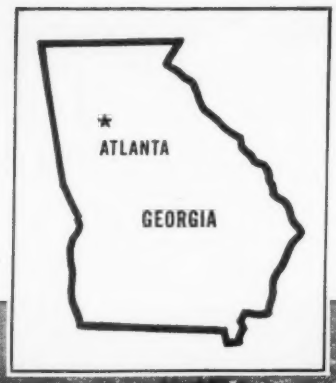
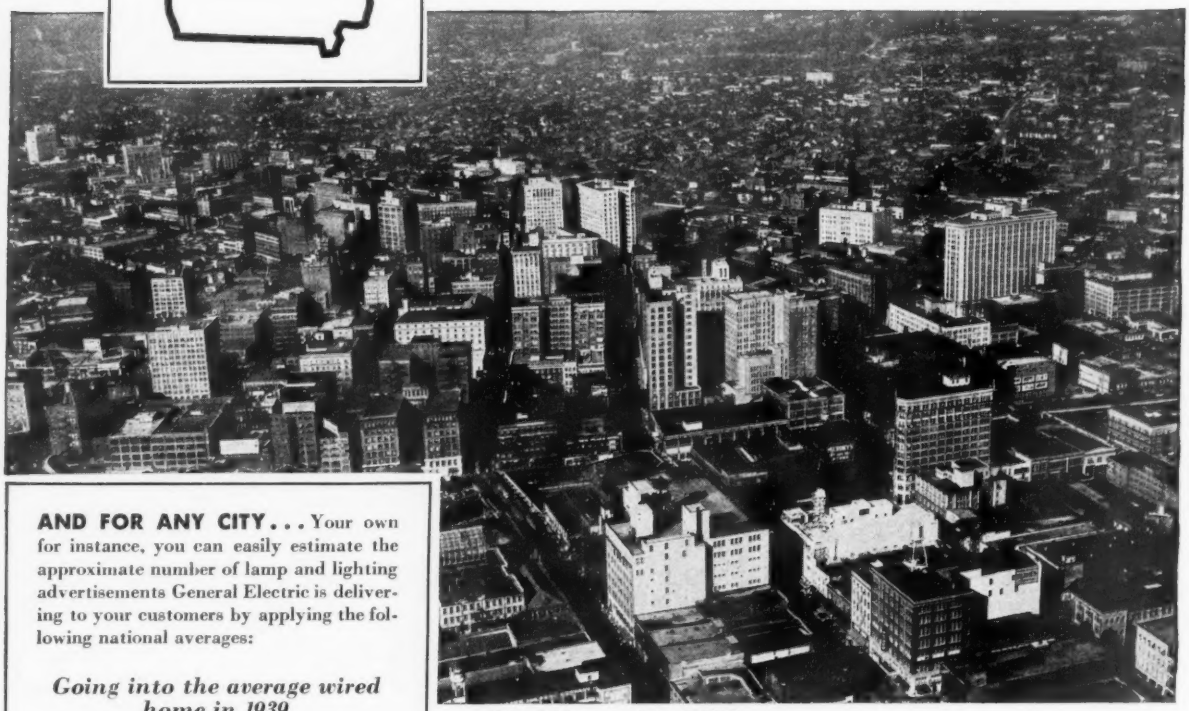


Selling lamps and lighting in ATLANTA, GEORGIA



View of Atlanta, population 280,000

AND FOR ANY CITY... Your own for instance, you can easily estimate the approximate number of lamp and lighting advertisements General Electric is delivering to your customers by applying the following national averages:

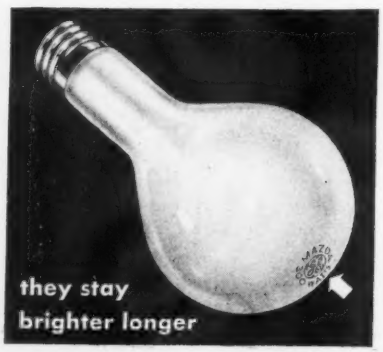
Going into the average wired home in 1939

14 magazines with G-E lamp ads
5 newspapers with G-E lamp ads
5 radio messages
24 total advertising messages

• • •

In the last 10 years, the average wired home received

158 magazines with G-E lamp ads
30 newspapers with G-E lamp ads
20 radio messages
208 total advertising messages



HERE'S a quick summary of the way that General Electric lamp advertising is constantly at work in Atlanta, promoting light-conditioning for Better Light-Better Sight. Into Atlanta homes every week goes a stream of G-E lamp and lighting advertisements amounting to 51 impressions per person in the last ten years.

IN 1939..... 801,000 magazines with G-E lamp advertisements and 368,400 radio messages.

SINCE 1929... 8,451,000 magazines with G-E lamp advertisements.

FALL 1938.... 1,152,000 copies of Atlanta newspapers with G-E lamp advertisements.

LAST 3 YEARS... 3,990,241 newspapers with G-E lamp advertisements.

SINCE 1929... 13,915,000 advertisements in magazines, newspapers, and radio . . . which is approximately 51 advertisements per capita.

G-E MAZDA LAMPS

GENERAL ELECTRIC

ELECTRICAL SOUTH

SEPTEMBER, 1939

Southern Dealers Plan Intensive Tie-in with

National Washer Week

APPLIANCE dealers throughout the South report that the period during and following the National Washer-Ironer Week sponsored in 1938 by the American Washer & Ironer Manufacturers' Association was the best that the home laundry industry has seen in the South in all its history. Accordingly, plans are already under way in both dealers' and jobbers' establishments for active cooperation with the Association in merchandising the national promotion this year, from October 14th to 21st, and to tie in with the national plans even more aggressively than they did last year.

The practical utility of home washing and ironing equipment should keynote the dealers' activity in supporting the Week, is the belief of Marvin Lunsford, manager of the appliance department of Hart's, leading Dallas furniture company, and elaborate plans are being made by Mr. Lunsford to do just that before and during the campaign. The Hart campaign is being based on the belief that, while home laundry equipment improvements will doubtless continue in some measure, they will largely be simply small refinements, and few innovations will occur from now on. Accordingly, he feels that washer merchandising should get away from too much emphasis on "sales features," and concentrate on the actual contribution of the equipment to better living.

Finding the 1938 campaign so effective, Mr. Lunsford has already hauled out the promotional display material from that week and has been conducting a "pre" National-Week promotion of his own, devoting an unusually large amount of the firm's appliance advertising to home laundry equipment in order to build up interest in the equipment which will be climaxed by the October promotion. Window displays are constantly being changed to vary interest, but are kept alive through such attention-catchers as the use of a glass washer, in operation in the window with a full load so that passers-by can see the circulation action of the water and the clothes.

Premium use is definitely an active part of washer merchandising, according to Mr. Lunsford, and he considers that washers and ironers are suseptible to premiums and "free-deals" without detracting from the appeal of the merchandise in any way. "The giving of accessories with the sale of a washer, such as clothes pins, soap supplies, and the like, is really a matter of service, which women have come to expect and appreciate," he commented. "Premium offers will form a definite part of our activity in this year's Washer-Ironer Week. We are tying in with the campaign, not only to create some institutional interest in home laundry, but to actually make sales, and we're doing it.

"We found last year that by employing a follow-up demonstration, we were able to close four out of five sales. Just as soon as a canvass salesman, or a floor salesman, reports a prospect with a good credit rating, out goes a washer for demonstration, and we have to bring very few of them back. We've hit on using the same system with ironers; if a prospect is interested in a washer demonstration, we send an ironer anyway. And few of them come back either. In other words, we're concentrating on utility, and usefulness, and demonstrating them, rather than talking too much about gadgets and mechanical features that the housewife doesn't often understand anyway. I be-

lieve that if more dealers work on this line, the Week will be a much more successful promotion."

Washer dealers and jobbers in the South believe that National Washer Week of 1938 was the first promotion to make a real dent on the hitherto impregnable practice in the South of turning over the weekly washing to a negress. Colored labor being so cheap and the practice being decades old, resistance to home laundry equipment has been extremely hard to overcome, according to South Carolina merchants. Backed by W. M. Perry, president of the Perry-Mann Electric Company, appliance distributor of Columbia, South Carolina, dealers in the Columbia area played up the sanitation angle when the campaign opened in 1938, and results were such that a strong backing of the Week is being planned for 1939.

Mr. Perry recalled the days when it was literally impossible to sell home laundry equipment there due to the prejudice of housewives against having their laundry drying in their own back yards. "The only prospects we used to have were Northerners who moved here, without the habit of sending the 'wash' to a 'negro mammy'," he chuckled. "However, the forceful promotion made available by the National Association has enabled us to make an impression on the native market, and I think dealers in this area will do a fine job this year."

Contests and "Favors" Used

Promotional efforts in 1938 included the distribution, through the dealers, of towels and other "favors," as an inducement to the housewives to enter stores and attend demonstrations. Prizes were offered to the leading dealers' salesmen in washer sales. The result of 1938's week was a 30% increase in business over the same period the previous year.

This year, the Perry-Mann Company will supplement the national prize offerings with a series of local prizes, ranging from $50 in merchandise to ten $5 cash prizes. Dealers in the Columbia area believe that premium offers are a substantial part of washer sales, and that the National Week should involve an extensive use fo premiums.

One window display alone, which was used by a Birmingham dealer in 1938, caused state-wide comment, and brought forcefully home to the consumer the message of the National promotion. R. P. McDavid & Company of Birmingham reported a 25% increase in sales over 1937, as a result of the campaign, and that business had increased 700% over the same period in 1934.

Association Given Credit

"We wouldn't be playing fair if we didn't give the American Washer & Ironer Manufacturers' Association credit for much of the success that has attended our efforts," said Mr. McDavid. "Last year we tied in with their campaign in several ways. We used the type of advertising they suggested, and backed it with the news stories they furnished. We used local and state-wide publicity to keep our goods constantly before the public. A full-time home economist worked our city trade, while additional economists were employed to cover the state in general. We sent our message through radio, billboards, car cards, bumper cards and window displays.

"One window we used to show the public the danger of sending laundry to the home of a washer woman. We pictured a typical back yard scene in the average negro home. About the tub and clothes ran children, cats, pigs, chickens, and dogs. The lack of sanitation in such methods was the theme, of course, and we stressed the dangers involved in 'sending out the wash' with astounding results. We found we were reaching a class of trade we had never been able to touch before. Incidentally, we found that demonstration trailers were most effective in following up the advantage gained by the displays and advertising."

The same type of tie-in will be employed this year during the national campaign, though more unified support will be given it. A recent meeting of dealers, utility executives, and distributors was held to plan the promotional efforts. Special demonstrations and a program of publicity were scheduled throughout the state. This group is known as the Electrical Appliance Dealers Association of Alabama.

Utilities have been very cooperative in Alabama, taking the lead in making the public conscious of the various appliances, and then withdrawing from the field, leaving it open to the retailers. Home economists and demonstrators have been furnished, and advertising support has been given by the power companies.

During August and September, leading up to National Washer-Ironer Week, a dealer-utility advertising campaign will stress the low-cost theme, "Wash Clothes Electrically for 1c a Week." During the Week, ironer displays and active demonstrations will be placed by each door of the McDavid store, to capture all the store traffic possible. Prospects will be invited to "step up and try their hands," so as to give them the "feel" of the ironer. "A sales presentation without demonstration is just conversation and usually without compensation," commented Mr. McDavid, "and we're going to demonstrate washers and ironers every chance we get."

Another feature of the Birmingham tie-in with the campaign will be the location of active demonstrations on the floors of strategically located automobile dealers, whose display windows and space will be open to much traffic. Theater lobbies will also be the scene of washer showings.

Texas Dealers Enthusiastic

"We're going to sell more home laundry equipment this year than has ever been sold in Fort Worth before!"

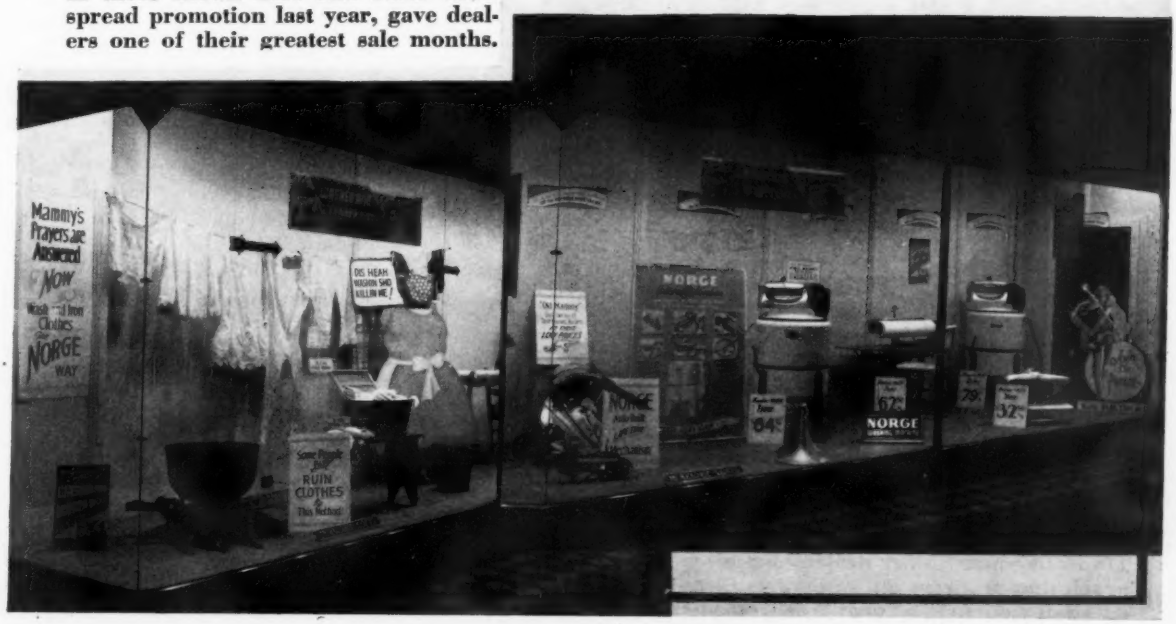
That's the keynote of the washer-ironer sales campaign planned by Dorsey L. Rooke, manager of the appliance department in Monnig's, 5th & Houston, in Fort Worth, to capitalize on the National Washer-Ironer Week promotion in October.

"Last year," commented Mr. Rooke, "we were unable to get the most good out of the national campaign because of lack of preparation, though we did work into it as much as possible. Seeing the spectacular results achieved by many dealers as a result of the Week, however, we've been planning ever since for a very active participation for 1939, and we're starting the ball rolling in August."

The starting gun for the Fort Worth dealer's activities was the opening August 14th of a national sales contest for dealers' salesmen sponsored by a manufacturer of electrical appliances which, Fort Worth retailers said, "made a very good opening date for our local efforts to get a running start for

A dealer window display contest is a feature of this year's promotion.

The combined effect of such displays as those shown here and other widespread promotion last year, gave dealers one of their greatest sale months.



the October promotion." Many individual prizes for retail salesmen will be captured by Fort Worth men if the dealers' plans materialize.

Not relying entirely on manufacturers' efforts however, Mr. Rooke is coordinating his sales force for an emphasis on washers throughout the next two months which he expects to culminate in a banner week's business in October. Particular attention will be given to the establishment of quota for individual retail salesmen; the potentials of each man, in relation to other products which he handles, will be taken into consideration, so as to avoid the discouraging factor of excessive quotas. The local territory assigned to each salesman will also be taken into account, and measures of protection of leads and prospects adopted to avoid any possibility of controversy. Territories will be balanced so as to offer each man a potential market in keeping with his quota.

"These measures to smooth the way for the salesman on the firing line are what I would call our most important activity in supporting Washer Week," commented the department manager, "since it is in support of the retail salesman's activities that the expensive advertising and promotion behind the contest is designed. We're concentrating more than ever before on 100% cooperation with salesmen, and emphasizing the cash-in possibilities offered by the season in home laundry between now and November."

A local contest, independent of the national manufacturers' prize offerings, is being designed to fit the local conditions in Fort Worth, so that incentive will be furnished for local competition as well as national.

A steadily increasing schedule of advertising began in the middle of August, stressing the utility and sanitation of home laundry, and will climax in a series of daily quarter-page insertions in the newspapers during Washer Week; radio announcements will also be used by the dealership during the October promotion.

Trade-Ins Expected

An added incentive to buy home laundry units during Washer Week will be offered by Monnigs in the form of temporarily extended trade-in allowances, and premium offers accompanying the sale of new units. The economy of the long trade allowances is explained like this:

"When this campaign is over, we're going to have a brief campaign on used washers," explained the dealer. "I know this, because I know that we're going to have some used washers on hand whether we take in any or not. That's because we're really going in for demonstrations during Washer Week; we're going to be sending them out every day.

"Demonstrations will be made both in the show room and in prospects' homes whenever they want it, and we're not just going to turn the machines on and show them how the agitator goes around; we're going to do plenty of washing, and when the campaign is over, the demonstrators are going to be plenty well used. Accordingly, we'll expect to have to do a little selling of the used units to clean up after the campaign, and we'll take whatever trade-in machines we get right in our stride."

Ironers to be Emphasized

Ironers, frequently hitherto subjucated to the washer in sales efforts, will also be pushed extensively this year. Several dealers are arranging in cooperation with local washer distributors, to send an ironer along with every washer sent out on demonstration. "After all, they can't get mad if you lend them the ironer for a few days," was one dealer's comment, "and if it comes back, the only thing that could be soiled about it is the cloth covering of the shoe. That only costs 25c to replace, and I consider a home demonstration pretty cheap at that price. Someone will be sent out to show the prospect how to use the ironer.

Supporting the trade-in arrangements, a Progressive Sales Plan has been adopted by Monnigs for the campaign, whereunder a purchaser may, after six payments have been made on a washer sold on time, purchase an additional unit without additional down payment. "That will sell a lot of ironers that they didn't buy with the washer," predicted Mr. Rooke.

One problem which has bothered Southern dealers in the past has been solved, to a large extent, by Monnig's. That is the habit of Southern housewives to patronize washwomen and home laundries. The Fort Worth dealer has found that, after working on users of such home laundries, there will be certain women who cannot be converted to the use of a washer themselves. In such cases, the salesman goes to the washwoman or home laundry direct, and sells *her* a washer. A number of unit sales have been made in this fashion, and several group orders have been gotten. This advance is made only as a last resort but, as a Monnig salesman said, "if we can't break down the housewife and if we know she's going to continue to patronize the hand laundry, we'd rather go after the latter than to make no sale at all."

D. L. Rooke, appliance manager of Monnig's, in Fort Worth, Texas, like many other dealers, has already started an intensive promotion program on washers and ironers which will have its climax during National Washer-Ironer Week in October.

Stokers in the Spotlight

Kansas City stoker distributors and dealers, with local coal companies and the Kansas City Power & Light Co., have launched a three-year campaign of major proportions.

A FEW months ago, Joe F. Porter, Jr., executive vice-president of the Kansas City Power & Light Company, had the idea of uniting the Kansas City stoker interests with the city's coal interests in a cooperative merchandising campaign to sell stokers against the strong competition of gas heat merchandising. At that time, Mr. Porter said: "We've just got an idea now; ask me in six months whether it's going to work or not."

The six months aren't quite up, but there remains no doubt as to whether or not the Kansas City utility-coal company-stoker-distributor combine is going to sell a lot of stokers. Carl Jennings, stoker expert from Kansas who was placed in charge of training the utility's sales force, states that he is speaking very conservatively when he declares that, without question, his sales force will sell 1,000 stokers this year. "And we've already sold quite a few," he added.

"To begin with," he commented, "The Kansas City Power & Light Company is the most aggressive merchandising organization I've ever been in or seen. The company's advertising budget, not counting in any stoker advertising, is nearly $300,000. The merchandise department is divided into three general divisions. These are the major appliance department, the minor appliance department, and the engineering department which handles large industrial work.

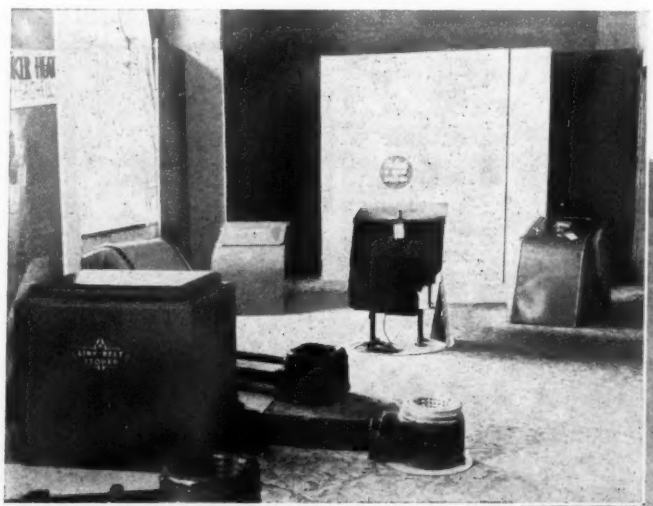
Stoker Market Analyzed

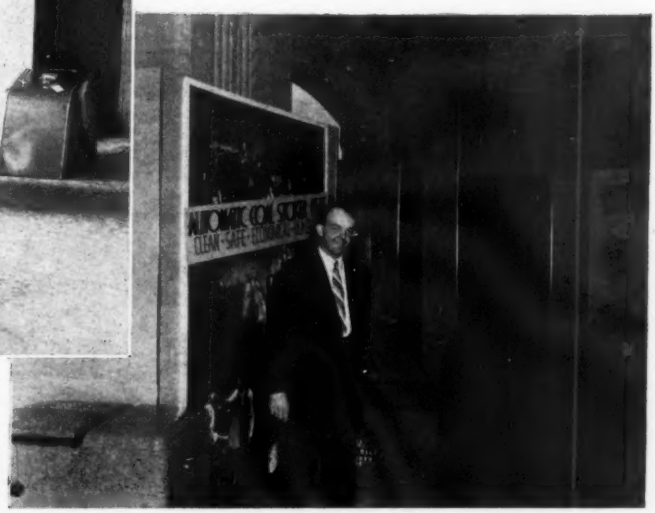
"This company analyzed the stoker merchandising situation from top to bottom. Its first conclusion was that stokers weren't being sold right; too many dealers wanted to wait for business to come in the door. Moreover, few stokers were installed properly, and practically none were serviced right. After all, the stoker is a comparatively new product, and few dealers have had the chance to be properly educated in its working, nor the time nor money to install a proper service department. And very few dealers indeed are large enough to afford an adequate stoker service department.

"Another conclusion was that there were very few good stoker salesmen in existence. Stokers are very different from the refrigerators and radios that most appliance salesmen have been selling, and very different methods have to be applied to their merchandising."

The thinking of the utility executives was combined with that of leaders in the coal interests of Missouri, Kansas and Oklahoma, with the result that the Bituminous Coal Utilization Committee of Missouri, Kansas, and Oklahoma was formed, representing about twenty mines in the three states, with headquarters in Kansas City.

The mines, represented by a committee, quickly appropriated





A permanent display of the six makes of stokers promoted in the campaign is maintained at the power company. Carl Jennings, right, is conducting a stoker sales training course for stoker salesmen.

an advertising fund of $15,000 for each year of the three years for which the campaign is scheduled.

Stoker distributors, backed by their cooperative advertising allowances from their manufacturers, and by their own "war-chest," formed the third figure at the table.

"Briefly, the plan is this," continued Mr. Jennings. "The coal committee is going to advertise coal. The stoker distributors are going to advertise stokers, over our name. We, and the dealers of Kansas City, are going to sell stokers."

The Advertising Program

The first advertisements in the campaign were broken in February of this year, but the real power went into effect in July. Every Sunday from then until December first, a full page will be carried in the *Kansas City Star* featuring the coal men's copy, institutional messages to drive home the advantages of coal as a domestic heating fuel. With each page of coal advertising, a half-page of stoker copy will be tied in by the stoker distributors and dealers.

"We're not leaving it to the advertising to do the job," Mr. Jennings went on. "Every consideration has been carefully weighed to make our merchandising foolproof. We have a staff of 42 first class appliance men, who are now going through a training period in selling and *knowing* stokers. We have a half-day sales school every day, which I'm conducting. And rain or shine, every one of those 42 salesmen is going to make 150 cold canvass calls every month, in addition to their natural leads and prospects. There are about 40,000 coal burning homes in Kansas City; that's a swell market to shoot at, and we're going to blanket it."

The stoker sales force is the one which handles only major appliances, such as refrigerators, ranges, and water heaters, so that nearly all of their efforts will be concentrated on stokers during the late summer and fall campaign.

Emphasis will be placed on proper installation and service, and in that connection, the utility has arranged a very unusual but satisfactory arrangement. All installation and service is being handled by the distributors, relieving the dealers and the utility of brick-laying and service worries.

"This places the installation in the hands in which it belongs," said Mr. Jennings. "The distributors, by installing all the stokers in Kansas City, can afford to have good service men, and can do a volume job of installation at a profit, where neither we nor the dealers can profitably put in such a department.

Stoker and coal advertisements are scheduled for every Sunday between July and December. Note the attention compelling copy of the committee representing coal companies.

A peculiarity of the coal produced in the three states involved caused the power company to conduct exhaustive tests, to determine which stokers are best adapted to handle that kind of coal. The field was boiled down to six makes, and they are the only ones which are being pushed by the utility and the Coal Committee.

Further evidence of the company's determination to do a thorough job of selling each unit is its policy that the stoker sales staff is to handle only domestic units up to 50 pounds in size. Larger units will be turned over to the industrial department, or engineered by Mr. Jennings.

Jobs Carefully Engineered

"Small units under 50 pounds are pretty well standardized," is Mr. Jennings' dictum on that point. "But conditions can vary a lot on big jobs. We're going to see that *all* jobs are laid out properly. To that end, every stoker job we sell will be inspected by someone from our headquarters twice: once before the unit is installed, and once after installation." In addition, each salesman is required to turn in an installation sheet on each job he contem-

plates selling, which describes fully the conditions, and makes possible a thorough analysis before the company approves the sale.

Besides putting a powerful selling force on the firing line, the Kansas City Power & Light Company is responsible for arranging remarkably attractive terms to attract stoker prospects. A $5 down payment is featured in all advertising. Then paper is discounted through the power company to a credit corporation, with terms up to three years and payments added to the monthly electric bills. Some thought is being given to the extension of terms up to five years.

"We're careful in evaluating credit deals, of course," Mr. Jennings remarked. "but stoker selling has always been very free from repossession trouble. Most stoker buyers are property owners, and good substantial people. A stoker, furthermore, isn't something that can be carried off like a radio. We're selling some units to renters, as well as owners, too, if they have been in their present residence for a few years and have good credit."

Free Service Extended

The distributors who install the stokers are extending a 90 day free service period, from date of first fire, and are undertaking to thoroughly instruct the purchasers in the operation of the units during that period. "After all," the utility executives reasoned, "the automobile industry still extends 30 days service, and it is a lot older than the stoker industry. It is up to the stoker merchandiser to teach the buyer how to operate the stoker, and to keep it running for him until he learns. This will not only make the stokers 'stay sold,' but will cause all word-of-mouth advertising given the product by users to be favorable."

Dealers, as well as the utility, find cause for rejoicing in the plan. They have no heavy investment to carry, since they need carry no stock outside of display units; and their sales, instead of a stock turn-over, have become simply commission sales wherein they receive 30% profit, more than twice what the average stoker dealer has realized in past years, after he had been chiseled down on the price, lost some money on installation and service.

Another happy person is the stoker distributor, who finds a bang-up sales force out pounding his merchandise, and who has added a profitable installation department to his operations, all retail prices being marked up $40 to cover delivery and installation.

Further insuring fool-proof operation of the machines after they are installed, the utility requires that no stokers be sold without complete controls consisting of thermostat, limit control, timer type coal fire, and line switch. The wiring on each installation must meet the approval of the city electrical inspector before the job is accepted for financing through the utility.

The power company believes in having real salesmen on its force, and has a liberal compensation arrangement for its stoker force, thus ensuring real talent. All salesmen are on a straight ten percent commission on all sales, with a drawing account of $125 per month, and $25 additional for automobile maintenance. "We have men who will earn $600 or $700 in a month at the peak of the season," said Mr. Jennings, "and who will average $350 a month the year around." The stabilization of the market through the Electric Association helps both dealers and utility salesmen, since, with no price cuts to be absorbed, the salesmen's commissions are not whittled down to take up the slack on price reductions.

Dealers and their salesmen are invited to attend the utility's daily sales classes in stoker instruction, and many are taking advantage of the offer.

Kansas City residents are already responding to the advance advertising put forth by the coal committee and the stoker distributors, as evidenced by the fact that the active sales season is already a month ahead of its schedule.

Dealer Opportunity In Stoker Sales

By L. W. Grove, Jr.*

ALTHOUGH only a relatively few electrical appliance dealers have recognized the fact, it is apparent that stokers have a definite place in the appliance business. Some progressive appliance dealers have started merchandising stokers and are finding that this line is a "natural" for them.

In the first place, a stoker line fills a very unproductive gap in the appliance dealer's business, as stoker sales usually are greatest when other appliance sales are declining. Furthermore, the salesman welcomes the additional items as he realizes that stokers present a real potential market, as he can go back to all of his old customers with a new product.

All appliance dealers have a show room which is further indicative that stokers would be an added asset, as a good display is important in stoker sales, the same as with other appliances. Few, if any, other home appliances on the market offer more per dollar invested than stokers, which naturally tends to lessen sales resistance. Needless to state, stokers give automatic heat, economically, with very little attention, which after all, overcomes the home owner's greatest problem during the heating season. Not only are stokers a convenience; they are considered good investment.

Selling stokers does not necessarily require any degree of engineering knowledge. All manufacturers have facilities today for educating and furnishing engineering aid to their dealers. "Specialty selling" is the secret and where else can be found more "specialty salesmen" than in the appliance field?

Overhead Not Increased

Another point to be considered is that the dealer can get in the stoker business without increasing his overhead. It is unnecessary to carry a large stock, add to the sales force or enlarge his show room. What more can be offered to increase profits, satisfy the salesmen and build up clientele? The stoker is the latest home appliance to be accepted by the public, so it should be natural for the dealer to add stokers to his line.

The stoker industry is one of the fastest growing industries in America and progressive merchandisers are cashing in on the business. At a not far distant time, all appliance dealers will have recognized that theirs is the natural outlet for stokers, but will they have acted to take advantage of the fact?

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*Sales manager for Frederick Stokers manufactured by the Frederick Iron and Steel Co., Frederick, Md.

Special Canvassers on Salary Basis Used Effectively

FIFTY salesmen, temporarily at liberty and scanning the want ads of a Washington, D. C. newspaper recently, suddenly reached for their hats and broke all speed records getting out to the Colony Radio Co., at 4835 Georgia Ave., N.W.

This is the ad that shattered the quiet of Georgia Ave. that rainy Sunday afternoon:

Wanted—Six men to sell electric appliances. Salary $25 a week.

Expecting a general mobilization of unemployed salesmen, Harold Stoll, proprietor, arranged to interview all applicants on Sunday. The response, he figured, would tie up business for any week day.

There was no lack of variety in the sales material presented for selection: bakery salesmen, roofing salesmen, "big shot" appliance salesmen, ex-sales managers, salesmen of all ages, married and single.

The six salesmen who got the jobs had never sold appliances before. Mr. Stoll did not make a point of ruling out those who had. But he was "afraid of them," he says—afraid that a straight salary proposition would not change old habits overnight.

In offering six jobs at $25 a week, Mr. Stoll was investing $600 in advertising. This is the amount he had set aside for a projected ad campaign.

"My neighborhood advertising results had always left something to be desired," he says. "The salesforce, whether on commission or drawing account, also had fallen short of the mark. Both needed a new idea. I decided, however, to spend the money on sales, believing a sense of security which a salary affords would have its reaction in a new type of sales effort. If the experiment failed, I could charge it off to advertising with no greater loss than I had experienced at any time before."

At the end of the first month, the six salesmen had averaged a cost of 20 percent figuring the $600 on a basis of commissions. But the sales activity, the number of new prospects, the new sales ideas that resulted during that first month were so far beyond expectations that Stoll kept his six salesmen and laid out another $600.

The results were progressive. There wasn't a sale the first week. By the end of the second week business had started to move. At the end of the month sales showed a substantial increase. On the last day of the month there were three washer sales within less than 24 hours.

The new salesmen didn't know much about appliances but they had all had selling experience and were stimulated by the new selling field.

"They didn't know all there was to know about selling appliances," says Mr. Stoll, "so I was able to tell them something. But for the most part, I allowed them to develop their own methods."

The first discovery the six salesmen made was that you can go back three or four days after you have made a cold canvass call and try again with good results. A large number of sales have been made this wey.

"I remember," says Stoll, "that we used to do this years ago, but none of my men had done it for so long, I had forgotten all about it. The commission salesmen had given it up long ago. The new men are getting better results on these callbacks than on seeing new prospects.

"The previous type of salesmen used to 'skip around' on their canvasses. The new men take a neighborhood and go over it systematically. They work a full 8 to 16 hours at it. They go out after the morning sales meeting and come in at noon. They go out again after lunch and return at the end of office hours. They are really working and earning their salaries. And they don't intend to let the job get away from them."

First new wrinkle in washer selling developed when one salesman found that prospects were easily persuaded to bundle up a wash and accompany him to the store for a demonstration. Seeing it work, all the others tried it out, and all are now using the idea. It's even easier, they found, than unloading a machine from a truck and dragging it down a basement stairs or into the kitchen of the prospect's home. Women prefer to use the store for a washroom demonstration. The salesman seats his prospect in an easy chair and goes to work. At the end of first three weeks, Mr. Stoll was used to the idea of having a washer demonstration with the prospect's own laundry going on

(*Continued on page* 14)

An experiment with salaried salesmen is working out very successfully, reports Harold Stoll, proprietor of the Colony Radio Co., of Washington, D. C. His sidewalk demonstration units, shown here, result in many interviews with passers-by.

Wiring Certification Plan Progresses in Charlotte

FROM Charlotte, N. C., come reports that considerable progress is being made in the "certification activity" of the Charlotte Adequate Wiring Bureau. A plan of the Bureau which provides any building contractor an advertising allowance of one per cent of the selling priec of a home which he agrees to wire according to the Bureau's adequacy standards is proving particularly effective.

In Forest Hills, a new suburban development just outside of the city limits, four houses have been built and all were wired to the certification standard. One of these houses was equipped with a modern kitchen and was named and advertised as "The House that Reddy Equipt" through the cooperation of the Duke Power Company and one of the local electrical dealers in Charlotte. In addition to the modern kitchen which was featured, the adequate wiring installation was extensively publicized and advertised.

Signs Emphasize Features

An adequate wiring sign was prominently displayed near the front door and there were a number of other signs, each presenting some special phase of adequate wiring, used within the house. The house itself remained unfurnished except for the kitchen equipment. The certificate of wiring adequacy was framed and placed on the living room mantel.

Other documents were framed and placed in each room—each showing a floor plan of the room and indicating the installation of various outlets in it. Arrows were run from these outlets to a typewritten description of the use of the outlet.

10,000 Visitors See Home

More than 10,000 persons visited this home during the two weeks' period it was open for public inspection and each received a number of printed pamphlets describing the kitchen and the adequate wiring installation in detail.

The adequate wiring activity was further assisted through the designation of one of the other homes in this group as "Miss Charlotte's 'Home of the Year'." Miss Charlotte is a commercial columnist for the *Charlotte Observer*, and each year builds and equips a house which she designates "Miss Charlotte's Home of the Year."

In addition to the newspaper advertising, billboards, and printed pamphlets, the Charlotte Adequate Wiring Bureau sponsored four fifteen-minute radio programs over the local CBS station.

In summing up the local activity, Charles B. Miller, Jr., chairman of the Advertising Committee of the Bureau, states that "up to the beginning of this Spring, we had only five houses certified and now have a total of seventeen. In addition to the four houses in Forest Hills, that were certified on the one per cent allowance plan, we have others certified through this same offer.

"One of these, incidentally, was in the $4,000 class, and we are particularly glad to get this type

This all-electric home was one of the first certified under the new plan of the Charlotte Adequate Wiring Bureau which allows a builder one per cent of the price of the home for advertising if it is wired in accordance with the Bureau's standards.

VISIT
the 'House that Reddy Equipt'
ON FOREST DRIVE
IN FOREST HILLS
SEE Reddy Kilowatt's
MODERN,
ALL-ELECTRIC KITCHEN
Here's a kitchen that truly enables you to say "Goodbye" to kitchen drudgery and "Hello" to leisure hours. A kitchen with Seven League Boots—where one step saves so many. Visualize yourself enjoying these features:
• ELECTRIC REFRIGERATOR
• ELECTRIC RANGE
• DISH-WASHER-SINK COMBINATION
• GARBAGE DISPOSAL UNIT
• ELECTRIC WATER HEATER
• COOKING FUMES DISPOSAL FAN
• ELECTRIC KITCHEN CLOCK
• KITCHEN CABINETS
This House Has A Certificate Of Adequate Wiring From Charlotte Adequate Wiring Bureau.
REDDY'S comforts are neither beyond your reach or too big for your pocketbook. You can live more economically and comfortably in a complete, electrically equipped home—a home that increases leisure hours.
Compare the price of this house with those similar in size, but not completely electrically equipped. It has a complete electric kitchen included in the sales price.
Also compare the cost of all the electric services you find in this kitchen with the cost of similar service in your home. You will be surprised to learn just how cheaply you can operate this complete electric kitchen.
HOME OPEN FOR INSPECTION
MISS MARTHA DULIN, Hostess in charge afternoon and evening, beginning today at 2 P. M.
FOR SALE BY
CAROLINA REALTY CO.
COMPLETE Hotpoint KITCHEN FURNISHED BY
W. L. PHELPS COMPANY

ADEQUATE WIRING Certified
Certified WIRING IN this BED ROOM
The Cool Breeze In this BED ROOM
Certified WIRING IN this LIVING ROOM
Certified WIRING IN this DINING ROOM
CHARLOTTE ADEQUATE WIRING BUREAU
ELECTRIC RAZOR
Certified WIRING IN this DEN
Certified WIRING IN this Master BED ROOM
Certified WIRING IN this HALL

These signs directed attention to particular electrical features throughout the "House that Reddy Equipt" in Charlotte. Unlike many such houses, open for inspection, this one was not furnished. Elimination of furnishings assured better attention for the electrical wiring and equipment.

of house. In addition to this small house that was being built by an operative builder, we also certified a private home that sold for about the same price.

"It is our intention to use the detail plans of these homes to help us convince builders and owners that it is economical and feasible to have houses in this price bracket certified. We are following up our letters to operative builders by personal contact and are very much encouraged at the results so far."

Mr. Miller also says that plans were made at a recent meeting for a committee of four jobbers to visit each electrical contractor in the interest of adequate wiring promotion.

Salaried Canvassers Tried by Dealer

(*Continued from page* 12)

in the salesroom at all hours.

Giving the salesmen a lead in developing their own initiative, Mr. Stoll found that stimulating effect of a salary was productive in new ideas all of which were identified by an eagerness for work. The method by which salesmen approach new prospects is typical. Each day they compile a list of addreses from a house number directory and send out sales literature to these prospects. They follow up these contacts next day with a personal call, arriving just behind the mailman. When they tell the housewife, "I sent you a letter yesterday," it serves not only as a conversational opener, but she can usually recall the letter, because it was received the same day.

Salesmen Get Commissions

If the salesman earns over $100 in commissions on his sales he receives the additional amount as well as his salary. The commissions are 13 percent on washing machines and 10 percent on refrigerators, ironers, and radios. No additional commissions were paid the first month, but one salesman, with no previous experience in selling appliances, equalled his salary in sales commissions.

In selecting the six salesmen, Mr. Stoll gave no preference to any type. He chose them in their twenties and in their forties, married and single. He selected those who were intelligent, courteous, and who seemed eager to learn and to work. Each prospect was interviewed progressively by Mt. Stoll and two assistants. Those were selected upon whom all three agreed.

Women's Club Members Supply Prospects

THE offer of $5 to the treasury of each women's club and organization who would bring a representative delegation to his store to attend a "Kitchen Demonstration" has enabled Leonard Haas, Norge appliance dealer in Morgantown, West Virginia, to deliver detailed demonstrations of refrigerator and range features to audiences of from 25 to 50 potential buyers rather than one or two.

"The groups came prepared to listen and observe," says Mr. Haas, "and stayed through to the end. There was no danger of the doors being shut in my face, or of my being told to 'come back later'. When you balance the ultimate expense involved in getting a satisfactory sales talk and demonstration in 25 or 30 different homes against the $5 donation we make to the clubs' treasury, you find that every such meeting we can hold saves plenty in sales and canvassing expense."

Demonstrations Varied

While many women come to the demonstrations merely to fulfill the club's agreement in order to qualify for the donation, Mr. Haas has arranged a skillful and interesting demonstration routine which immediately captures their interest and makes a lasting impression on even the most uninterested. Frequently a complete home laundry is executed by a skillful salesman, who accompanies his washing with a running explanation of the various convenience features of the home laundry unit used. Time and food saving features of refrigerators and ranges are emphasized in a simulation of normal cooking routine.

When the meeting is over, the ladies are asked to fill out a questionnaire itemizing the electrical appliances with which their homes are equipped, and are asked to state frankly their interest, if any, in the various home appliances. "We never fail to get a few really good prospects," says the dealer, "and frequently can spot a potential replacement market by the age of the various items down on the questionnaire."

The club members are also offered a 2% commission on any appliance sale in which they may be instrumental in closing, by informing Mr. Haas of prospects they know.

Lighting for Bank Reflects Warmth and Hospitality

BANKING may be a prosaic business and considered by many to be rather cold-blooded, but a banking institution can be made to reflect warmth and hospitality by modern lighting and design, as well as by the attitude of its personnel.

Dignified simplicity, with a marked absence of ornate filigree work or "gingerbread" design, is the outstanding characteristic of the recently completed Hillcrest State Bank in University Park, a suburban city adjacent to Dallas, Texas. Yet at the same time the bank gives the impression of beauty and elegance. It is a decided departure from conventional bank building design.

Wiring was installed by Hall Electric Company, Dallas, and is as modern as the construction of the building and its banking features.

Front of building is of cream colored Carrara glass, with black trim. Combined with large window areas of glass blocks, this gives a unique all-glass finish to the front and sides.

The building is two stories in height, though the photograph is deceptive. The correct impression of its height can be gained from noting height of double front doors. Above the doors is a heavy curved-glass "skylight," almost equal to height of doors. Set in the center of this glass section are a half-dozen large replicas of coins from the earliest American times to the Buffalo nickel.

Large bronze plaques were placed above windows. The Texas star in the center of the plaque is set out from the wall and is silhouetted by light from green and gold gaseous tubing. These lights are automatically turned on as soon as dark approaches.

The central feature of interior lighting design is an illuminated dome employing nearly a hundred 25-watt lamps, concealed in a circular cove. Ten 500-watt lamps, using special reflectors and pattern-type louvres, are also recessed in the central ceiling. Fourteen recessed louvred units with 300-watt lamps illuminate the desk areas at each side.

There is a Neon clock concealed behind the blue mirrored wall at center of room, only the hands, figures and outline of clock being visible. The frame is in blue Neon. It is the only light left on inside the bank at night.

Naturally every provision possible was made to assure safety. There are numerous electrical signalling devices for use of tellers and other employees in case of emergency. A push button at each teller's space operates a lamp-type annunciator made a part of the large door at left rear wall. This

(*Continued on page* 71)

Lighting effects play an important role in imparting an atmosphere of modernness to this suburban bank building near Dallas, Texas. An illuminated dome and recessed fixtures are features of the interior; glass blocks, illuminated decorations, and a front of cream and black Carrara glass give the bank an attractive outer appearance. An unusual feature is the teller's window for motoring clients.

"Visible Examples" Stimulate Interest In School Relighting Programs

By Geo. H. Watson

RELIGHTING of the city schools little by little in conformity with modern school illumination standards is the object of a program initiated recently by the Birmingham Electric Company.

The schools are handicapped by lack of finances, as is so often the case in the South, so that it was not feasible to promote a general relighting program for the schools all at once, however desirable this might be.

The program had to proceed slowly for financial reasons but this made more time available to stimulate a greater school lighting consciousness among parents, teachers, school executives and the pupils themselves.

With this general object in view, the utility in cooperation with Parent-Teachers Associations has been instrumental in installing demonstration lighting jobs in a dozen school rooms in different parts of the city. These installations have shown effectively the need for better lighting in other rooms, a number of which are still of the drop cord type. After all, it is difficult for anyone to appreciate the desirability of better lighting until he has lived with and experienced its benefits.

A typical installation was the one made at the Hemphill School in accordance with Nela Park recommendations. Here, two 150 watt drop cord lamps were replaced with six 500-watt fixtures in two rows, the three lamps nearest the windows being controlled by a photo-electric cell while the three nearest the inside wall are controlled by a manual switch. If, with the three lights nearest the wall on, the illumination still is not up to the required 20 foot-candles, the photo-electric cells turns on the other three lamps nearest the windows.

The color scheme in the room was changed to provide better light reflecting values as well as a more cheerful atmosphere. An egg shell white was used for the ceiling, a flat-tone light green for the upper walls and a semi-lustre medium green for the wainscoting. These colors are said to have a cool, quieting effect, besides giving the room an air of spaciousness.

Some time after this installation was made, the electric utility sponsored a city-wide Parent-Teacher luncheon at the school, attended by 225 persons. A lighting specialist from the General Electric Company was on hand to speak on "The Relation of Lighting to Visual Education." An inspection of the "sight-saving" classroom was one of the features of the meeting. Since that time the Parent-Teacher Association has raised money to relight another class-room in the school and similar activity has taken place in other schools.

While no test has been made in the Hemphill School, Principal Raymond D. Hulbert said it had been shown elsewhere that apart from the important matter of eyesight conservation, pupils in the scientifically lighted rooms definitely made better grades. In addition better posture was encouraged.

"Our first effort has been to arrange for an excellent job of lighting in a few classrooms," said Luther T. Cale, assistant to W. W. MacLaren, manager of commercial sales. "These have not been compromises, but actually are the best that could be obtained, for they must serve as the visible example of the goal toward which we are aiming. And so far, they have

(*Continued on page* 71)

Limited finances have made impossible a general relighting program for Birmingham schools but the Parent-Teachers Associations in cooperation with Birmingham Electric Co. have obtained at least one correctly lighted room in every school. These rooms, such as the one shown here before and after relighting, furnish visible examples that help maintain interest in better lighting.

CODE CHANGES FEATURE BUSINESS PROGRAM OF Southern Section I.A.E.I.

11th ANNUAL MEETING IN ASHEVILLE, N. C.

MAKING their headquarters in the George Vanderbilt Hotel, the Southern Section, International Association of Electrical Inspectors, will hold their eleventh annual meeting in Asheville, North Carolina, on September 18, 19 and 20.

Most of the three day business program of the Southern Section will be devoted to discussions of the Article Committee reports to the 1939 meeting of the Electrical Committee on proposed revisions and changes for the 1940 National Electrical Code.

The local arrangements committee is preparing an interesting entertainment program for the delegates and special plans are being made for the entertainment of lady guests. The climax of the entertainment program will be the annual dinner dance scheduled for Wednesday evening.

Local arrangements have been under the general supervision of C. T. Johnson, general chariman. Committee chairmen assisting Mr. Johnson include: H. H. Hix, Graybar Electric Company, exhibit committee; R. D. Campbell, City of Asheville, finance committee; C. H. Gudger, City of Asheville, program committee; Joe Hadden, Carolina Power & Light Company, reception committee; J. Fitzgerald, Asheville Fire Department, trips committee; Sol Naiman, Naiman Electric Company, photographer committee; and Ruth Mitchell, City of Asheville, registration.

Others who are assisting the local committee are Dan Stewart, Southeastern Underwriters Association, Atlanta, badge committee; Harry Biglin, Atlanta, publicity committee; George Welman, New Orleans, booster committee.

Tentative Business Program

Monday Morning, September 18

Address of Welcome, Honorable Mayor of Asheville
Response to Address of Welcome, T. W. Bowry, Chief Electrical Inspector, Dept. of Public Utilities, Richmond
Address of Section President, A. J. Bommer, Service Engineer, Underwriters' Laboratories, Inc., Dallas
Address of International President, Dr. M. G. Lloyd, Chief of Section of Safety Codes, National Bureau of Standards, Washington
Roll Call and Registration
Report of Executive Committee, John LaTour, Building and Electrical Inspector, Daytona Beach
Report of Chapters
Report of International Secretary, Victor H. Tousley,

Officers of the Southern Section, I.A.E.A., left to right: Frank G. Camus, Shreveport, second vice president; A. J. Bommer, Dallas, president; C. S. Whitaker, Durham, first vice president; and Joseph Whitner, Atlanta, secretary-treasurer.

Electrical Field Engineer, National Fire Protection Assn., Chicago
Appointment of Committees

Monday Afternoon, September 18

Address on Code Changes Proposed by Edison Electric Institute, Henry J. Morton, Detroit Edison Company, Detroit
Discussion of Electrical Committee Article Committee Reports on Proposed Code Changes
Preventing Fires Through Electrical Safety (Motion Picture), J. W. Whittington, National Electrical Manufacturers' Assn., New York
Discussion of Proposed Code Changes

Tuesday Morning, September 19

Address on Proper Wiring of Panelboards, M. M. Brandon, Associate Electrical Engineer, Underwriters' Laboratories, Inc., New York
Discussion of Proposed Code Changes

Tuesday Afternoon, September 19

Address, A. R. Small, President, Underwriters' Laboratories, Inc., Chicago
Discussion of Proposed Code Changes
Address, Arthur L. Abbott, National Electrical Manufacturers' Assn., New York

Wednesday Morning, September 20

Discussion of Proposed Code Changes

Wednesday Afternoon, September 20

Address on Fluorescent and Other Recent Lighting Developments, Carl W. Evans, Editor, ELECTRICAL SOUTH
Discussion of Proposed Code Changes
Report of Resolutions Committee
Report of Nominating Committee
Election and Installation of Officers

Adjournment

Responsibility of Code Making

By Morton G. Lloyd
President, International Association of Electrical Inspectors

THE formation of the Southern Section of the International Association of Electrical Inspectors more than a decade ago brought to the South the realization that there was a branch of the electrical industry whose chief concern was to see that electric installations were made safely and properly and by the use of suitable materials and equipment.

The method of the men forming this branch of the industry was electrical inspection, superimposed upon which in some instances was the control of the sale of the electrical goods so that the unfit and unsafe equipment would not reach the contractor and the consumer. Inspection is made in some instances by representatives of insurance companies, but more often by employees of municipalities or the state, who have legal authority and the power to compel compliance with definite standards.

The most widely used standard for the interior wiring of building is the National Electrical Code, periodically revised by a committee of the National Fire Protection Association, and published by the National Board of Fire Underwriters. This committee includes representatives of a wide range of interests, the majority of its members representing the inspectors, the manufacturers, the utilities, and the insurance companies. This year the municipalities are being given greater recognition through the U. S. Conference of Mayors, which has expressed its interest in all codes which are to be enforced by city officials, and its desire to participate in the revision of such codes by representation upon the committees which carry out the revisions.

Since the safety from fire and casualties is the chief concern of the electrical inspector, he has a very vital interest not only in the specific Code rules, but in the application of principles which must be a guide in framing the detailed and specific rules which he is to enforce. Consequently the revision of the Code deserves his detailed consideration, and constitutes a major activity of his Association. Its meetings are devoted very largely to the discussion of needed changes in the Code, and to proposals for change made by others. He has the experience which indicates that some items are essential, others superfluous. He brings this experience to meetings where his representatives may consolidate this experience and apply it to the practical work of Code revision. It is not only to his own interest to attend the meetings and learn of the experience of others, but it is also a duty and responsibility to make his own contribution on items where his own contracts have been outstanding.

Code making and revising is a serious responsibility. It should be based upon known facts and experience rather than upon opinions. One should not compromise with safety; therefore, commercial considerations must take a secondary place, and not interfere with setting standards of reasonable safety. A code is not like a purchase specification or a contract, wherein a certain amount of bargaining may be involved to make it satisfactory to both parties. Bargaining and compromise are out of place in code making. Commercial interests should be heard but should not make decisions. The public interest is paramount, and the representatives of the public interest should have the final decision.

This year the Code revision for a 1940 edition is of particular im-

portance. The proposals for change which are up for consideration are important and very voluminous. A change of schedule makes it possible for the annual meetings of inspectors to consider and review the reports of the subcommittees (known as Article Committees) of the N.F.P.A. Electrical Committee, an opportunity which they never before have had. It is consequently more important than ever before for the inspectors to attend the annual meeting of their organization at which these items will be reviewed, and also for the electrical contractors, jobbers, manufacturers, and utility company representatives, who constitute the associate members of the Association, to participate in the discussions, and contribute their own views and experience.

It is becoming more and more evident that safety depends not only on methods of installation, but on the quality and design of the materials and equipment used. Many municipal ordinances and state laws provide for standards of materials as well as for standards of installation. The National Electrical Code deals mainly with installation, but contains also some basic requirements for materials and equipment. Details are largely lacking, and in some cases have been dropped after practice has become established. It is a question for consideration whether specifications for materials and equipment should be set up by the same machinery as the Code rules (as is done in Canada), or should be left to other organizations such as Underwriters' Laboratories. Such specifications are involved not only in electrical inspection, but in the enforcement of sales-control ordinances.

Many questions of this kind deserve the discussion of the electrical industry and especially of the inspectors, who carry the responsibility to see that installations are safe. The meeting of the Southern Section at Asheville provides the opportunity. The entire industry of the Southern States should utilize it.

Message from the Southern Section President

THE year 1939 has been a prosperous one electrically and, along with a great deal of work for all concerned, many new and totally different improvements have come to hand.

Many of us have not had a real opportunity to review these and from my own viewpoint I know of no better way to do this than by attendance at the fall meeting of the Southern Section in Asheville.

The year for our association has been in keeping with the studies of industry in that many new members have come into our folds. It is my belief that the outstanding progress of the Southern Section activities is in a big measure responsible and I have therefore based by theme for the Section in the following:

The Real Men Dare and Do

The real men dare and the real men do,
They dream great dreams which they make come true,
They bridge the rivers and link the plains,
And gird the land with their railway trains.

They make the desert break forth in bloom,
And send the cataract through the flume,
To turn the wheels of a thousand mills,
And bring the coin to a nation's tills.

By A. J. Bommer
Underwriters Laboratories, Inc., Dallas, Texas

The real men work and the real men plan,
And, helping themselves, help their fellowman.
And the sham men yalp at their carriage wheels
As the small dog barks at the big dog's heels.

Then I have set a motto entitled, *Forward*:

The beginning of a year is the time when we are want, first, to take stock of ourselves; second, to analyze our habits and capacities; and third, to take steps properly to direct our future efforts. Taking stock is sometimes disappointing because in doing it we realize how little we have accomplished comparative with what we feel we should have done but in the very process of being jerked up to a consciousness of short coming is often born a determination to improve our status by elimination of non-essentials on which we have wasted precious time, of industrial and class prejudice cherished by personal dislikes and jealousy.

Self-analysis nearly always shows we have been too critical of the other fellow and not critical enough of ourselves. We have considered ourselves very efficient and very broad minded, but have been intolerant of our fellow's creed, his political faiths and the natural traits and characteristics which are his because of the race into which he was born.

An honest stock taking and self-analysis will surely point the way we have gone as we stand at the initial mile post of another year's activities. That will be the way of tolerance, of self-discipline, of united association, served through the medium of a society of men of many faiths, creeds, and technical ability and directed to the common high purpose of protecting and serving each other and the general public.

As members of an institution which through many years has built such a record of sound judgment and diligent research accomplishments as has ours, we should concentrate our efforts upon a still wider application of its tenents in the days ahead.

As adherents of these beliefs and traits, we should look but one way: *That way is forward.*

It is my sincere wish that each of you will attend the meeting and try to secure and bring with you a new member and a new idea.

Help keep the motto going "Forward" intact.

Unusual Importance Attached To Asheville Meeting

By Victor H. Tousley

Secretary - Treasurer, International Association of Electrical Inspectors, Chicago, Illinois.

THIS year's meeting of the Southern Section will be the most important meeting this Section has ever held, and one that no representative of the electrical industry who has an interest in the National Electrical Code can afford to miss.

There are two major reasons for the unusual character of this meeting. Heretofore the electrical inspectors, and those of the industry who attended the inspectors' meeting, have had an opportunity only to suggest changes in the current code, and to discuss the code changes suggested by others. Before another meeting of the inspectors' association occurred, however, the new code had been issued and was in effect.

Due to the fact that the interval between codes has been increased from the original two-year period to a three-year period—the next code will be the 1940 edition—those in attendance at this year's meeting of the Southern Section will have an opportunity to hear detailed explanations of the code changes proposed by the various Article Committees, and will in addition have an opportunity to discuss these proposals if they so desire.

The National Electrical Code is a code of the electrical industry and by the electrical industry, and in this respect is outstanding among codes of a similar nature. Heretofore the industry has had many opportunities to take part in code revisions, but with the new arrangement the opportunity will be vastly expanded.

Many members of the Electrical Committee will undoubtedly be present at the Asheville meeting, and these will include the chairmen and members of many of the Article Committees. The opportunity for these Electrical Committee members to listen to discussions of the proposed changes by those who will later enforce the code provisions should be of unquestioned value in producing a better code.

On the other hand, the opportunity for those who must conform to the code: contractors, wholesalers, manufacturers, and utilities, to obtain a clearer understanding of the purpose and intent of the code requirements will be of inestimable benefit.

Those who have had an opportunity to study the 118-page report of the Article Committees cannot fail to recognize that this year's meeting of the Electrical Committee will consider many items of fundamental code importance. The question of recognition of new wiring methods which involves a partially insulated neutral conductor, the question of recognition of bare neutral conductor, the solution of the problem of wiring in existing office buildings, hotels, and similar buildings, with the possible increase in conduit fill, are all problems of major consequence in the electrical field.

The new rubber insulating covering for conductors with the high current-carrying capacities, and

(*Continued on page* 71)

Simplification of Feeder Load Calculations Proposed

By Joseph Whitner

Secretary-Treasurer, Southern Section, I. A. E. I., and Assistant Chief Engineer, Southeastern Underwriters' Association.

A TENTATIVE supplementary report has been offered by Article Committees 210 and 220, headed by Harvey N. Pye. chief engineer, Southeastern Underwriters Association, which proposes a method of calculating feeder loads by using the load necessarily calculated for branch circuits, with proper demand factors, rather than requiring two separate sets of calculations as is necessary with the present Code.

The proposed method appears to

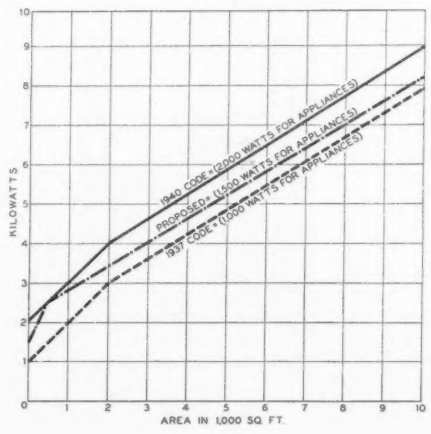

KILOWATTS
AREA IN 1,000 SQ. FT.
1940 CODE (2000 WATTS FOR APPLIANCES)
PROPOSED (1500 WATTS FOR APPLIANCES)
1937 CODE (1000 WATTS FOR APPLIANCES)

Fig. 1. This chart shows the relation between feeder load in kilowatts for dwellings of various area as required under the 1937 Code, the proposed changes of the Article Committee for the 1940 Code, and the tentative supplementary report of Article Committee 220 presented here. Under the revision proposed by the tentative supplementary report, feeder loads for dwellings would be obtained by adding lighting and small appliance loads. Feeder load would include 100 per cent of the first 2500 watts or less and 30 per cent for all excess over 2500 watts.

be especially desirable for the new Code in view of the proposal to expand the number of installations in which the "watts per square foot" method of calculating branch circuit loads is used. The proposed revision will greatly simplify these calculations for both circuits and feeders.

Because this tentative supplementary report does not appear in the "Electrical Committee Article Committee Reports to 1939 Meeting" published in July, 1939, it is presented here.

Section 2107a is one of those that will be affected by this proposed revision. This change would require that small appliance loads be included as a single item amounting to 1500 watts total except in single-family dwellings of less than 1000 square feet. This revision will result in an increase of branch circuit loads in some few dwellings or individual apartments but the Article Committee feels that this is necessary to obtain proper results in feeder calculations, especially for apartments. The change would simplify this section considerably.

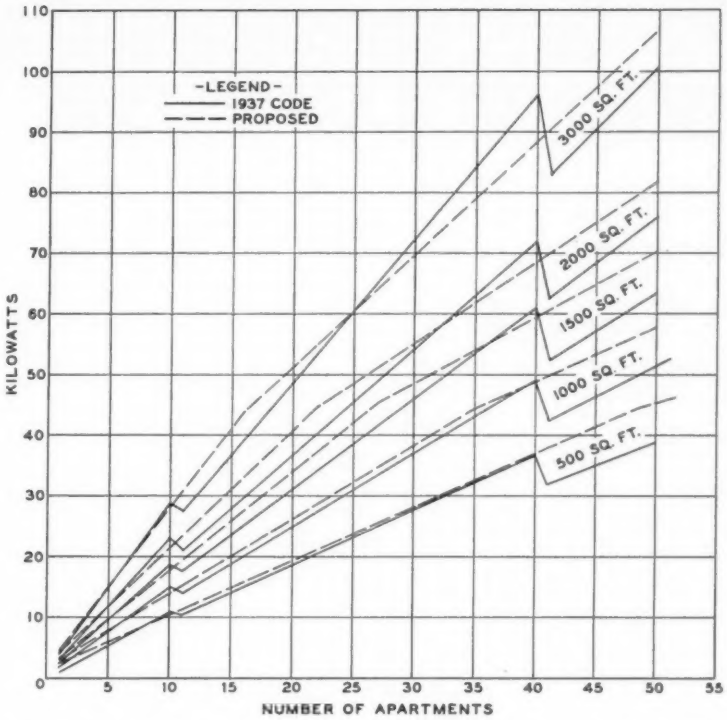


Fig. 2. The relation between feeder loads for apartment buildings as calculated under the 1937 Code and the proposed revision included in the accompanying tentative supplementary report are shown here for various numbers of apartments and areas. Feeder load for apartments would be calculated as follows under the proposed revision. Total load would be obtained by taking lighting at 2 watts per square foot and adding 1500 watts per apartment for small appliances. A demand factor would be applied to this total as follows: 100 per cent of the first 3000 watts, 35 per cent for excess over 3000 watts up to 120,000 watts, and 25 per cent of all excess over 120,000 watts.

Feeder Calculations

The tentative supplementary report also proposes a revision in Section 2202. Revised paragraph "a" of this section merely states that the feeder load for lighting shall be the total branch circuit load with the demand factors of Table 17 properly applied and includes all types of installations. Paragraph "b" requires the addition of the specific small appliance loads. The exception "b-1" has been revised to permit the small appliance loads in single-family dwellings and apartments to be included with the lighting loads for application of demand factors, thus eliminating the need for Table 18-A.

For the sake of simplicity and uniformity of treatment between dwellings and apartments, the proposed 2000 watts for appliances in dwellings was reduced to 1500 watts. However, in spite of this reduction, the proposed revision will result in an appreciable increase in feeder loads for dwellings over the requirements of the 1937 Code. The relation between feeder loads for dwellings of various areas as required by the 1937 Code, the report of Article Committee 220 to the 1939 meeting, and the supplementary report of Article Committee 220 which follows, is shown in Figure 1.

Table 17 Simplified

The change proposed in the tentative supplementary report affects Table 17 of Chapter 9. In this revision, an attempt has been made to simplify this table as much as possible and the accompanying diagrams show the effect of this change in method of calculation. This table can be further simplified by deleting those occupancies where entire load is included at 100% as these would be covered in the note "Other Buildings or Occupancies." As shown in Figure 2, the revision of Section 2202 and Table 17 will effect a considerable improvement in the load curves for apartments. Under the proposed method, it is not necessary to change the demand factor with the number of apartments.

The proposed revisions of this tentative supplementary report would increase the wattage for hotels to 2 watts per square foot. However, by reducing the demand factors ½ and doubling the wattages of Column "C," Table 17, the feeder loads obtained will equal loads obtained from the 1937 Code. There will be a slight reduction in feeders of over 100,000 watts as the factor 30 per cent is used for simplicity rather than one-half of the 70 per cent called for in the 1937 Code.

Stores Affected Slightly

Calculations for feeders for stores remain practically unchanged, as show windows are included in the lighting load of Section 2107, except that specific reference to counter cases, which has caused considerable confusion, is deleted; where this equipment is encountered, the specific load would be included under 2107b-2. Office buildings, garages, schools and storage warehouses will not be affected by the proposed revisions.

A	B	C
Type of Occupancy	**Watts Per Square Foot (See Sec. 2107)**	**Application of Demand Factor to Load Served (See Section 2202)**
xSingle-Family Dwellings	2	100% for 2500 watts or less 30% for excess over 2500 watts
xMulti-Family dwellings (other than hotels) and apartment houses with provisions for cooking by tenants.	2	100% for first 3000 watts or less 35% for excess over 3000 watts but not more than 120,000 watts 25% for excess over 120,000 watts
Hotel	2	*50% for first 20,000 watts or less 40% for excess over 20,000 watts but not more than 100,000 watts 30% for excess over 100,000 watts
Store	3	100% for entire wattage
Office Building	2	100% for first 20,000 watts or less 70% for excess over 20,000 watts
Industrial Commercial (loft) Building	1	100% for entire wattage
Hospital	2	*40% for first 50,000 watts or less 20% for excess over 50,000 watts
Garage	.5	100% for entire wattage
Schools	3	100% for first 15,000 watts or less 50% for excess over 15,000 watts
Storage Warehouses	.25	100% for first 12,500 or less 50% for excess over 12,500 watts

(x) Small appliance loads may be included to determine the total load for application of demand factors.
(*) Sub-feeders to areas where entire lighting is likely to be used at one time, as in ballrooms, dining rooms, operating rooms, etc., 100% demand factor shall be used.

Other Buildings or Occupancies—For occupancies listed in table of Section 2107-b-1 and not included above, and for manufacturing plants, industrial occupancies or any other building or occupancy or apparatus requiring special circuits, not provided for in the above table, the specific load to be served shall be used in determining the size of feeders.

Proposed revision of "Table 17—Demand Factors for Lighting Loads," appearing on page 280 and 281 of the Code.

Industrial commercial (loft) buildings will not be affected by the proposed revision except that the note referring to these buildings is deleted for simplicity since the type of building specified in the note is not generally encountered.

Table 18 Simplified

As a result of the changes proposed in Section 2202, Table 18 would consist of only the present Table 18-B—Demand Factor for Household Electric Ranges.

Of course, the adoption of these proposed revisions will necessitate a revision of the sample calculations beginning on page 294 wherever these examples are affected by the proposed revisions.

The tentative supplementary reports of the two article committees are as follows:

Tentative Supplementary Report of Committee on Article 210-Branch Circuits

(References: 1937 National Electrical Code, with necessary changes in preprint of Committee Report noted.)

2107. Calculation of Load—

Revise sub-paragraph a to read:

a. Dwelling Occupancies. In residences, apartments, guest rooms of hotels and clubs and in other occupancies used for dwelling purposes, the load shall be determined on the basis of not less than 2 watts for each square foot of floor area. An additional load of 1500 watts for small appliances shall be included for dining room, kitchen and laundry purposes, except that in single-family dwellings of less than 1,000 square feet, the additional load may be 1,000 watts. Capacity shall also be included for any special or permanently connected appliance load in accordance with the wattage rating of the appliance.

In a single-family dwelling with a floor area of 500 square feet or less, the load may be determined as specified in sub-paragraph b of this section.

(Present fine print notes to be retained without change.)

Tentative Supplementary Report of Committee on Article 220-Feeders

(References: 1937 National Electrical Code, with necessary changes in preprint of Committee Report noted.)

2202. Computation of Feeder Load. The computed load of a feeder shall be the sum of the branch circuit loads supplied, subject to the following provisions:

a. Lighting Load. The demand factor according to Table 17, Chapter 9 may be applied to the lighting load as determined by Section 2107 for the occupancies listed therein.

In single-family dwellings and individual apartments of multiple-family dwellings, the small appliance load may be included with the lighting load and subject to the demand factors of Table 17; where the load is sub-divided through two or more feeders, the computed load for each shall include not less than 1500 watts for small appliances.

b. Appliance Load (Other Than Motors). The demand factors according to Table 18, Chapter 9 may be applied to loads consisting of one or more household electric ranges and other cooking and baking appliances that are individually rated at more than 1650 watts.

See paragraph above in reference to small appliances.

c. Motor Load. The load for motors shall be computed according to the provisions of Section 4314 and 4316.

(Present fine print note to be retained.)

d. Neutral Feeder Load. The neutral feeder load shall be subject to the provision of Section 2203.

(The above replaces Section 2202-b-1 of Committee Report.)

Page 280. Revise this page to read:

Table 17—Demand Factors for Lighting Loads.

The feeder load for lighting shall be computed in accordance with Section 2202 with application of demand factors given in the following table. (Editor's Note: See table elsewhere on this page.) (Retain last paragraph on page 280 as revised in preprint of Committee Report but omit all other paragraphs.)

Delete page 282 and revise caption of page 283 to read:

Table 18—Demand Factors for Household Electric Ranges.

(This replaces recommended revisions on page 19 of Preprint Committee Report.)

The EEI Code Proposals

What are they? In spite of considerable publicity there are a great many in the industry who are unfamiliar with them. They are discussed here in considerable detail.

By J. O'R. Coleman

Engineer, Edison Electric Institute, New York

THE Edison Electric Institute, trade association of the power companies in the United States, has been actively engaged in the study of improvements in wiring methods and systems in order to provide for economical increased capacity of interior wiring systems so that greater use can be made of its product,—namely, electricity for lighting, power, appliances, air conditioning, and the many other uses which have developed in the last few years.

As a result of these studies the Edison Electric Institute has proposed eight basic modifications in the code. Each of these eight proposals should be considered on its merit, and judged accordingly as to whether it will provide safe practice in the interest of the public. It is the public that holds the purse strings and ultimately says whether a job is acceptable or unacceptable.

The modifications of the code proposed were presented in an article by C. W. Kellogg, published in the *Electrical World* of May 7 and May 21, 1939. We repeat the proposals and give our understanding of their purpose.

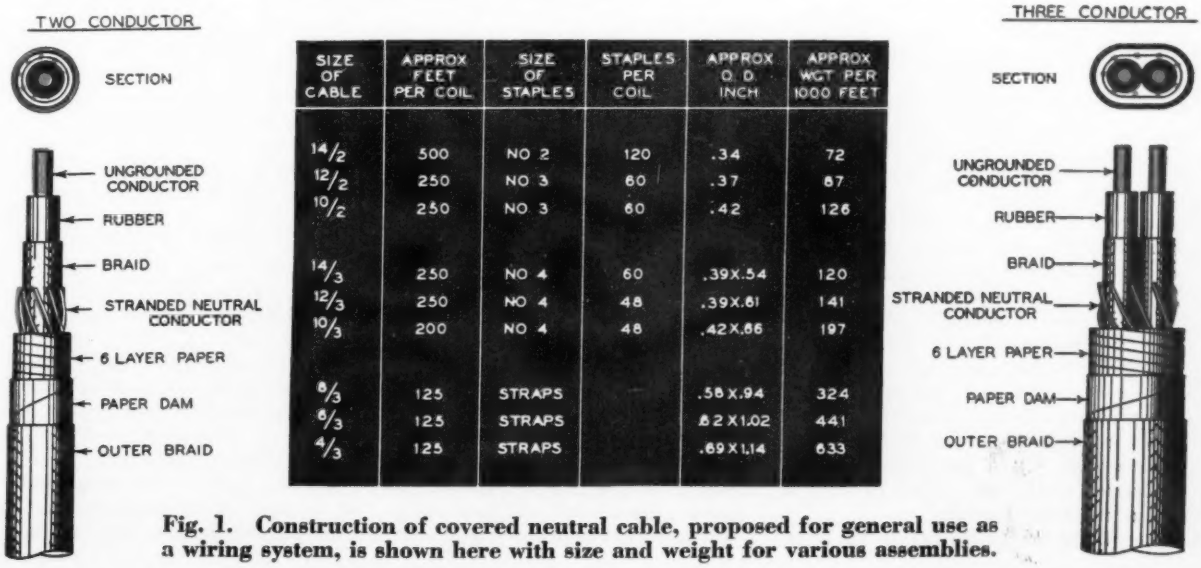
(1) Provision for general use of non-metallic sheath cable of the covered neutral type as a wiring system.

Cables of the covered neutral type were approved and have been in use for several years as service entrance and range circuit wiring, and are manufactured in a number of different types. About four years ago a new type of covered neutral cable was developed by joint action of a group of wire and cable manufacturers. These assemblies are designed for use where the conventional non-metallic sheath cable or metal armored cables have previously been employed. They are intended for installation in farm buildings, residential buildings, residential garages and small commercial occupancy where the type of building construction contains hollow spaces within walls, partitions, floors and ceilings. In certain situations this type of cable assembly is also advocated where it proves economical for use inside of rigid conduit or electrical metallic tubing.

Figure 1 shows the construction of the covered neutral cable and its size and weight for various assemblies.

It will be noted that the assembly essentially consists of a conventional rubber covered wire surrounded by stranded neutral which in turn is covered by heavy paper and then bound together with an outer braid of the type which has been used for many years on non-metallic sheath cable. This assembly, made by a number of reliable wire manufacturers, has been extensively tested by the Underwriters Laboratories.

The electrical tests included a break-down between the neutral conductors and a tank of water after 24 hours immersion. The breakdown under these conditions was found to be slightly under



SIZE OF CABLE	APPROX FEET PER COIL	SIZE OF STAPLES	STAPLES PER COIL	APPROX O.D. INCH	APPROX WGT PER 1000 FEET
$14/2$	500	NO 2	120	.34	72
$12/2$	250	NO 3	60	.37	87
$10/2$	250	NO 3	60	.42	126
$14/3$	250	NO 4	60	.39X.54	120
$12/3$	250	NO 4	48	.39X.61	141
$10/3$	200	NO 4	48	.42X.66	197
$8/3$	125	STRAPS		.58X.94	324
$6/3$	125	STRAPS		.62X1.02	441
$4/3$	125	STRAPS		.69X1.14	633

Fig. 1. Construction of covered neutral cable, proposed for general use as a wiring system, is shown here with size and weight for various assemblies.

1,000 volts. Many mechanical tests were made, such as driving the cable into a board, or other severe treatment. In practically every case a short circuit occurred between the inner conductor and neutral before the neutral conductors were exposed through the outer braid. These tests show conclusively that the covering is adequate to withstand abuse as well as the normal service requirement.

(2) Provision for the use of duplex and multiple conductor cables of the covered neutral type in raceways of all classes.

No safety reasons have been found to bar the use of the covered neutral cable in raceways. Under certain conditions of conduit fill its use would prove economical and advantageous. Due to the economics of the situation it does not appear that this use would be very extensive, but advantage of it should be allowed where the economics dictate and where there are no safety features to point against its use.

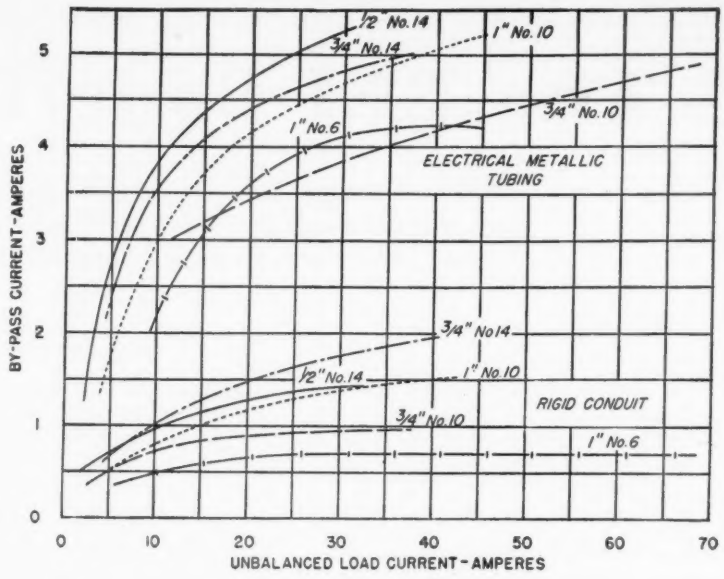


Fig. 2. The magnitudes of by-pass current which may be expected for various load currents in conduit of various sizes when bare neutrals are used are indicated by these curves. They represent results on only a few of a large number of tests upon which data has been published by the Edison Electric Institute.

(3) Provisions for bare neutral in conduit and electrical metallic tubing for general use.

The proposal is for the use of bare neutral wiring for a-c circuits. Experience has shown that bare neutral wiring is of greatest economic importance in connection with rigid conduit and electrical metallic tubing installations. It is in these situations where the saving of space in the raceways provides much valuable additional capacity to the system through the elimination of the installation on the grounded neutral conductor.

The practice of insulating the neutral conductor the same as the energized conductors started before grounding was considered as a safety measure, and has been generally followed ever since. Originally interior wiring started with two-wire direct current supply when each wire was subject to the same voltage stress. With growth, three-wire d-c circuits were introduced and extensively used. Although in central station practice the center or neutral wire was grounded for operating reasons, there was little thought given to the use of the neutral as a protective means.

With the introduction of alternating current, experience with interior lighting circuits, fittings, devices and equipment, soon showed that the solid grounding of one wire of the circuit offered overall advantage from the standpoint of protection from fires and personal injury, as well as operating and maintenance advantages. The advantage of the grounded neutral as a protective element for a-c circuits was more and more recognized in succeeding editions of the National Electrical Code,—the more outstanding changes being:

Grounding at customers' premises permissible—1901.

Grounding at customers' premises preferred—1903.

Grounding at customers' premises mandatory—1913.

Elimination of neutral fuse permissible—1923.

Solid neutral mandatory—1925.

Identified neutral—1925.

Use of common rather than separate grounds, for neutral and conduit—1933.

Use of neutral conductor for grounding, as in range circuits—1935.

These changes have transformed the neutral wire of the circuit to one of practically no potential to ground and have made of it a valuable protective device. However, there has been no fundamental change in the insulation requirements or the methods of installation during this period.

Fear has been expressed of the effects of stray alternating currents on other structures within buildings. Under present wiring practice there is a division of current at the service entrance ground. This current divides according to the impedance of the two or more paths which exist, but there is no record of any damage being done by it.

Apparently there has been considerable misunderstanding as to the magnitude of the stray current which would exist with bare neutral wiring. Alternating current divides between two or more parallel paths in accordance with the relative impedance of the various paths. The metallic envelope of rigid conduit and electrical metallic tubing acts as a choking effect on the current which tends to return outside of the conduit. This choking effect increases with increasing magnitude of current, and results in relatively small by-pass currents, according to the results of tests published by the Edison Electric Institute.

Figure 2 shows the magnitudes of by-pass current which may be expected for various load currents

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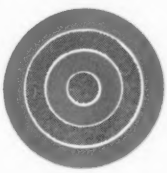
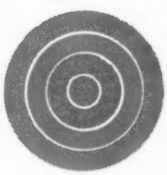


MEDIUM — *two rings only energized, giving approximately ¾ of High heat distributed as illustrated.*



CENTER — *middle ring only energized, permitting the use of small utensils with maximum efficiency and economy — the exclusive Chromalox "two-units-in-one" feature.*

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SIMMER — *all three rings at low intensity, giving 1/16 of High heat.*

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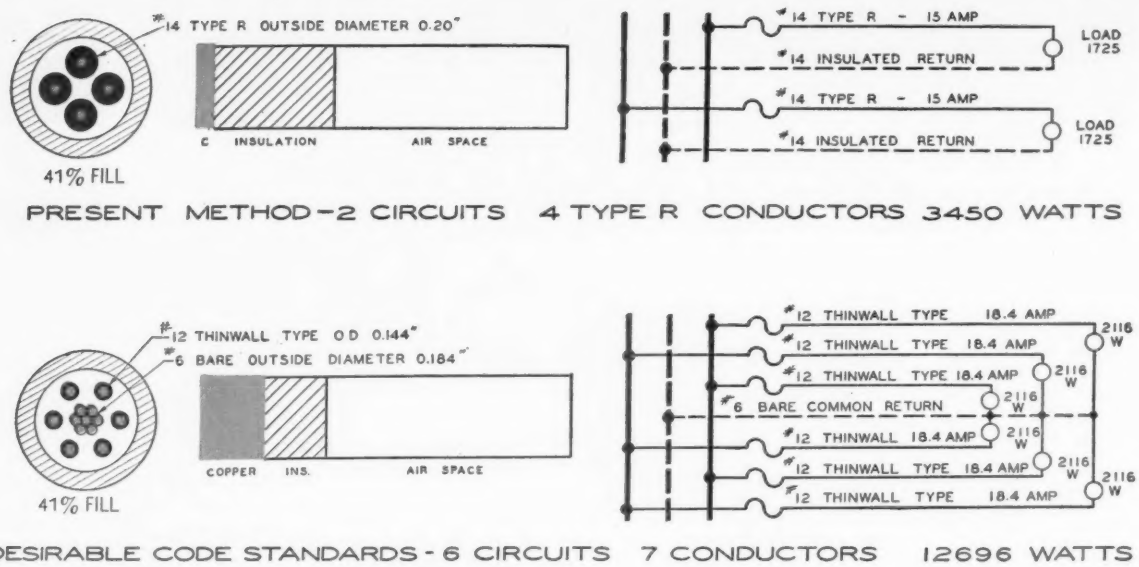

#14 TYPE R OUTSIDE DIAMETER 0.20"
C INSULATION
AIR SPACE
41% FILL
#14 TYPE R - 15 AMP
#14 INSULATED RETURN
LOAD 1725
#14 TYPE R - 15 AMP
#14 INSULATED RETURN
LOAD 1725
PRESENT METHOD - 2 CIRCUITS 4 TYPE R CONDUCTORS 3450 WATTS
#12 THINWALL TYPE O D 0.144"
#6 BARE OUTSIDE DIAMETER 0.184"
COPPER
INS.
AIR SPACE
41% FILL
#12 THINWALL TYPE 18.4 AMP 2116 W
#12 THINWALL TYPE 18.4 AMP
#12 THINWALL TYPE 18.4 AMP 2116 W
#6 BARE COMMON RETURN 2116 W
#12 THINWALL 18.4 AMP 2116 W
#12 THINWALL TYPE 18.4 AMP 2116 W
#12 THINWALL TYPE 18.4 AMP 2116 W
DESIRABLE CODE STANDARDS - 6 CIRCUITS 7 CONDUCTORS 12696 WATTS

Fig. 3. The combined use of increased conduit fill, thin-wall insulation, and bare neutral, will permit an increase in the current carrying capacity of existing conduits by as much as two, three or even more times. In the example illustrated here, 6 thin-wall conductors and one bare neutral in a ½-inch conduit results in a fill of 41% and will handle 12,696 watts load as compared to only 3,450 watts that may be handled by four type "R" conductors.

in conduit of various sizes. It should be noted that these current divisions are based on the magnitude of the neutral or unbalanced current and not on the magnitude of the total load current of the system. Neutral or unbalanced current would never exceed the load current of the insulated conductors under practical conditions, and generally would be much smaller.

The Underwriters Laboratories in 1934 made a survey of existing bare neutral installations. This report contains the following item in its conclusion:

"The existence of by-pass currents as noted in this report was not found to have any effect respecting service, corrosion, arcing or heating, or to have any effect respecting the fire and accident hazard of the wiring installation."

(4) Provision for the general use of thin-wall insulation.

The past few years has seen concentrated study and research, both in the laboratory and in the manufacturing plant on rubber, rubber products and synthetic material. The progress which has been made along these lines in other fields is well known to everyone. Twenty years ago one would brag to all his neighbors about an automobile tire that ran 3,000 or 4,000 miles. Today a tire must run 30,000 to 40,000 miles before it is worth mentioning. Improvements in materials and improvements in manufacture has brought about this enormous change.

Likewise, efforts of the laboratories have been directed towards the development of improved insulating material for conductors. It is now possible to reduce the thickness of conductor insulation and yet provide mechanical and electrical characteristics at least equal to those now required by the National Electrical Code. With smaller overall diameter wires, the amount of copper can be materially increased in existing raceways. A larger number of conductors of the same gauge can be installed or the same number of conductors of a larger gauge.

These newly developed thin-wall conductors can be used to replace existing conductors in conduit which cannot be readily changed. The space saving of thin wall insulation is of greatest advantage for the smaller gauge conductors. For instance a No. 14 type "A" conductor has an area of 41% of the standard type "R" conductor. For a No. 8 conductor the area is about 52%.

ering developed by various wire and cable manufacturers differ in type of material used and in overall diameter. The detail dimensions, trade name, manufacturer and price of the conductors now available are shown in a pamphlet entitled "Commercial and Industrial Building Rewiring Market," which is available through the Edison Electric Institute.

Some of these conductors are insulated with rubber and others with synthetic compounds. Depending on the type of rubber or synthetic employed, operating temperatures may be as high as 60° C., or 75° C., in contrast to the upper limit of 49° C. permitted on the present code Grade Type "R" insulation. These new types of conductors fall into three size classifications, which have been designated. Sizes A, B and C.

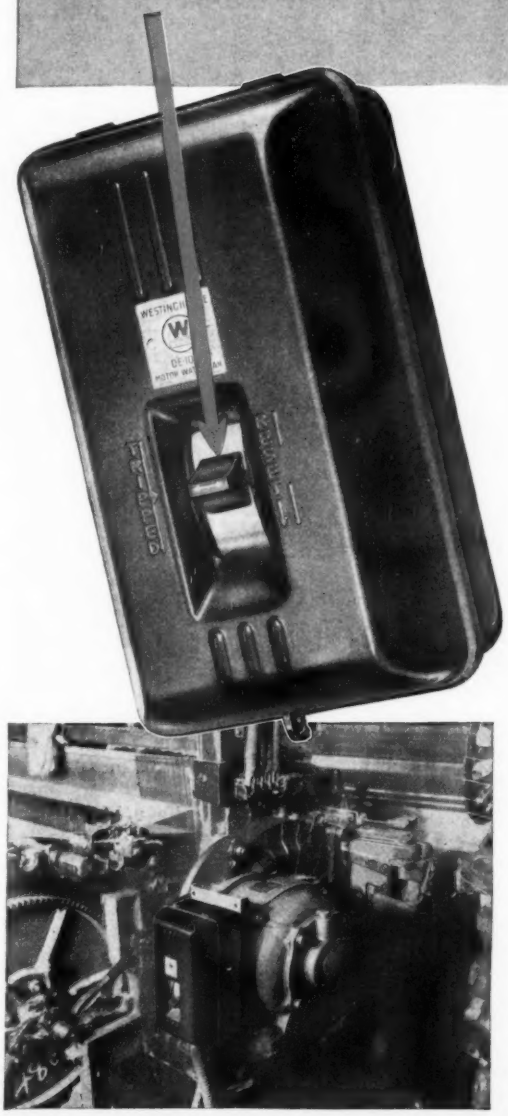
(5) Modification of conductor area rule to permit in old installations utilization of the waste space for additional wire required by increased loads.

At the present time the National Electrical Code provides with minor exceptions that the conduit fill shall not exceed 40% for three or more conductors. The specific

The new types of conductor cov-

(*Continued on page* 70)

IT'S EASY TO SEE WHETHER THIS STARTER IS on-off OR tripped



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Westinghouse "De-ion" Motor Watchman

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More Adequacy in Wiring

How the changes in the Code proposed by the Edison Electric Institute will help promote it.

FOR more than a year active and earnest discussions have been carried on among members of the Electrical Committee which revises the National Electrical Code, the people who consult with them, and those who are interested in Code revisions. The subject of these discussions are the proposals made by the utility groups to the N.F.P.A. Electrical Committee in 1938 looking towards important changes in some of the practices now permitted or required by the Code.

The purpose and intent of the utility recommendations have been clearly explained in two articles by Mr. C. W. Kellogg, president of Edison Electric Institute, which were printed in the *Electrical World*, May 7 and May 21, 1938. These articles were reprinted in the Edison Electric Institute publication, "Discussion of the Revisions of the National Electrical Code Proposed by the Electric Light and Power Group." They were further briefly re-stated on pages 2 and 3 of that pamphlet, as follows:

"The proposals are intended to produce more work. In particular they are calculated and intended to produce more work on wiring jobs in the rewiring field and therefore are independent of general activity in the building industry.

"Technically, the proposals are directed toward more copper, more circuits and more outlets, that is, toward actual technical adequacy for interior wiring installations. We believe this objective is the most far-reaching and the soundest safety measure that the Code has had occasion to deal with since grounding was established.

"All of the proposals are safe as engineering practices, from the viewpoints of both electrical design and safety, and do not constitute a lowering of safety standards. There has been no intention to introduce unsafe practices in detail for the sake of the overall objective, even though this is in itself an outstanding safety measure.

"No changes are proposed which would operate against any established commercial product (except possibly the conventional Code rubber building wire). On the contrary many of the proposed changes would have the effect of extending the field of usefulness of many products.

"Some of the proposals are specifically restricted to rewiring jobs in existing installations, others are intended for application to rewiring. So far as their practical utility is concerned, they probably could be so restricted, although in principle this may not always be a very sound course.

"Limitations upon the capacity of a wiring system are, in general, the space capacity of the raceway, the I-squared-R losses in conductors, and the regulation. Control of the two latter factors make it desirable to utilize the maximum possible amount of raceway space with copper. It appears to be desirable to retain the existing provisions of the Code for new work."

By E. A. Brand*

Chairman, Wiring Committee
Edison Electric Institute

In short the objective is to secure more adequacy in wiring with complete safety. This means that larger quantities of permanent wiring will be installed by contractors and labor; that more motors, appliances, fixtures and lamps will be sold; that more kilowatt hours will be used by utility customers. The broad effect is more business for the entire electrical industry from manufacturer through to the electrical journeyman.

It should be emphatically stated that the utilities are interested in these proposals only if more wiring is installed through their use and if markets are broadened. They will not be satisfied if the total dollar volume of wiring is not increased by reducing unit costs as proposed. Naturally a change in the cost level, as such, will not automatically bring substantially increased volume without sales effort. Hence, these new materials, and methods must be aggressively promoted as otherwise the change would mean little.

It should be equally emphatically stated that the utilities cannot afford to be and are not interested in any wiring material or method which can be demonstrated as being unsafe or as introducing hazards. To pursue any other course would be commercial suicide. Conversely the utility groups have submitted proof that these proposals will result in wiring just as safe as is now installed under Code provisions and that in some cases the degree of safety secured will actually be increased due to technical improvements. The engineering basis for the proposals is found in the EEI publication previously mentioned.

The electrical industry has been talking about wiring adequacy and doing things about it for some

*Mr. Brand is associated with Buffalo, Niagra and Eastern Power Corporation, of Buffalo, New York.

IF YOU SELL APPLIANCES — OR WANT TO PROMOTE ADEQUATE WIRING . . . .

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Permits washing machines, ironers, refrigerators, etc., to be plugged in on circuits already well loaded — without needless blowing of fuses.

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As is well known there is no substitute for a proper size fuse to protect against such commonly occurring shorts.

On short-circuits, the Fustat, because it has a fuse, opens the circuit before dangerous arcing can occur.

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Once the proper size Fustat is installed it cannot be replaced with substitutes or sizes that are too large.

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If circuits are not adequate, the user cannot dodge the issue by bridging the fuse or by over-fuseing and sacrificing safety.

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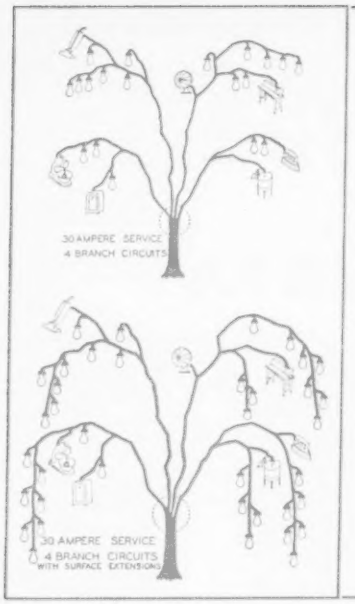
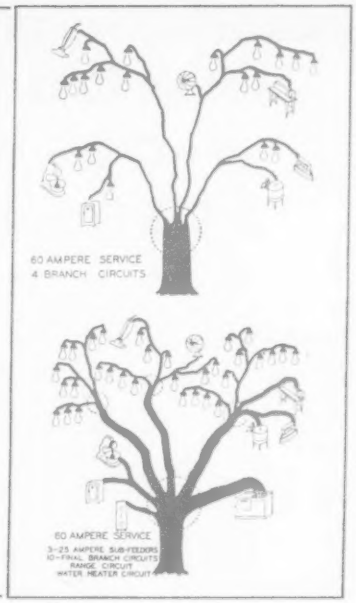


The slender "elm" at the upper left is representative of a residence wiring system having a 30-ampere service and four branch circuits. Below, is what happens when the slender elm is overloaded by means of extension cords or surface extension systems. Insufficient copper capacities in both trunk and branches introduce the drooping condition—representing voltage drop—and show that there is too much electrical use for the quantity of copper.

At right, top, this tree has had its trunk enlarged which corresponds to increasing the service to 60-amperes. This has improved the voltage regulations; makes a more favorable condition for adding a new branch for a range or other appliance outlets.

The tree at bottom, right, represents an adequate wiring system for today's average-sized modern home—with more of the appearance of a sturdy oak. The trunk represents a service of 60 amperes or larger; the substantial limbs are subfeeders supplying branch distribution centers; and plenty of final circuits and outlets are supplied from these subfeeders.



years. Every one is familiar with the work of electrical leagues and associations in promoting adequate wiring in residences. Strenuous efforts are made by manufacturers, contractors and utilities in pleading with architects and businessmen erecting new commercial and industrial building to provide for the future with adequate initial wiring. Thousands of copies of the Handbook of Interior Wiring Design have been purchased and distributed. A united industry is backing the National Adequate Wiring Bureau, which is stimulating local groups throughout the country to drive on wiring adequacy in new residences. An influential trade association has recently set up committees to study the best approach to the commercial and industrial wiring market. So-called "outlet campaigns" have been sporadically carried on locally for many years.

Industry's Greatest Problem

All of this indicates that wiring has been a problem to every branch of the industry. The approach so far has been largely from the sales promotion standpoint, using the technical wiring products available at the time and in vogue in the area where the promotional work is being carried on. Unfortunately some utilities and some members of the other industry groups have been soundly asleep at the switch and a few still are. Now, however, the industry as a whole realizes its responsibility and is either actively at work or ready to go to work.

In the home, lack of outlets, too few branch circuits, small services and voltage drop due to heavy-duty appliances are common and distressing conditions. The tremendous sales of lamp cord and extension materials through various channels indicate that the householder is developing into his own wireman, starting with any existing outlets that may be available and carrying on from that point. Or else, he puts appliances and lamps on the shelf because of the inconvenience or impossibility of using them. An increased number of outlets originally installed with proper copper capacities behind them will correct this condition, will make it easier to sell better-sight lamps, thousand-watt irons, roasters, unit air conditioners, attic fans and the other multitudinous devices still continually being developed for the home.

The problem of wiring for the electric range is so well known that it need not be touched on here, except to state that in their present recommendations to the Code Committee the utilities are applying the same principles of product development which were used to solve that situation and which resulted in increased volume due to a reduction of unit cost to the point that the householder felt justified in paying the price or the utility could afford to absorb it. Again aggressive promotion was a vital part of the picture, just as it must be with the new materials and methods.

It has been stated that 90% of all commercial and industrial buildings have insufficient copper capacity. The increase in accepted levels of lighting over the past ten years has been so tremendous, particularly with the impetus given by the Better Light-Better Sight program, that this statement is probably correct. Existing conduits are often loaded to capacity and where more capacity is needed they are frequently overloaded to the point where unsafe conditions

Existing Load Conditions

result. The cost of replacing concealed raceways with larger ones is such that little has been done, broadly speaking. Under the circumstances it is essential that ways and means be provided for safely increasing the quantity of copper in existing raceways, in branch circuits and feeders. When that becomes possible through code acceptance of the proposals submitted, a profitable rewiring market will be opened to the whole electrical industry.

It is problems such as these that the utility companies are confronted with and to which they feel their proposals offer at least a partial solution. Rewiring of existing residences is a major job also before the technicians and the salesmen of the industry. It must be successfully attacked some day soon.

Product development plays an

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Right for These Applications

- For protecting motor circuits.
- For use with additional circuits where installations have already been made.
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- 15-20-25 ampere capacities.
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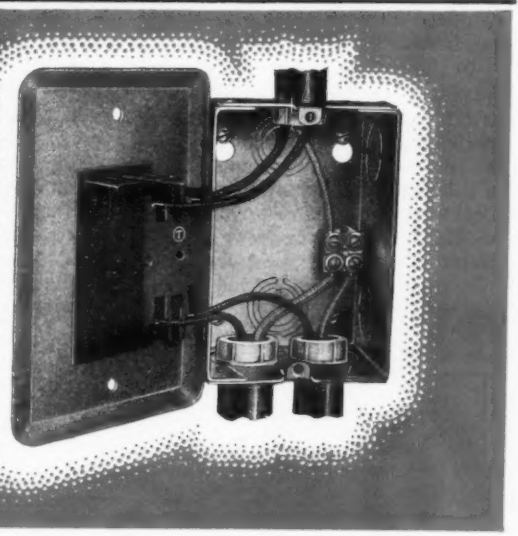

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Extremely COMPACT, with entire mechanism enclosed in Textolite unit base, attached to cover.

EASY TO WIRE because cover and breaker are removable as a unit. Ample wiring space in box. Aluminized finish of inside of box facilitates inspection and wiring.

TAMPER PROOF . . . calibration sealed at factory, cannot be changed. Indicating handle trips free . . . cannot be held closed against short circuit. Breaker handles can be sealed in "off" position with wire seal, also provision for sealing cover if specified.

AVAILABLE for flush or surface mounting with insulated grounded neutral in same size compact box, with grounded neutral or no neutral.

LOW MAINTENANCE COST . . . nothing to replace . . . nothing to repair . . . nothing to corrode.

There's a ready and waiting market among YOUR customers and prospects for this newest addition to the Trumbull Line of Multi-Breakers. Be among the first in your territory to sell this modern, more convenient and SAFER type of protection for the purposes listed above.

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important part in the continued growth of any industry and is indispensable to successful sales activities. The results of technical research affect our lives so intimately and are so commonplace that it is difficult to realize the progress that has been made. Building construction itself, during recent years, has undergone important changes. Developments in concretes, in steels, in welding, in flooring and acoustical materials, in window fronts, in structural materials such as glass brick, and in design have changed the appearance of our buildings to such an extent that older structures are definitely dated. No industry is immune to technical developments; every industry benefits from them in the long run. This is true of building wiring materials and methods. As knowledge of the art increases and as chemical and electrical research develop better products, these are brought into the market and eventually find their economic level in competition with older established products.

In the field of generation, transmission, and distribution of electricity, electric utilities have experienced the tangible advantages of research in the development of a better product at lower unit cost. Service to the farm, for instance, would still be impractical in many parts of the country now served if new methods and improved materials had not shown the way to lower costs per mile of line. Here lower costs widened a market. Lowered unit costs and aggressive promotion resulted in an outstanding sales accomplishment for the domestic refrigerator industry.

This has been the experience in electrical manufacturing and merchandising generally. Nowhere in the world are electrical appliances so inexpensive, so abundantly in use and of such high quality as in the United States, and the volume of sales continues to rise. Electric utilities throughout their history have been successfully lowering rates and coupling this with aggressive sales promotion to obtain a larger volume of business.

With such accomplishments to the credit of the electric industry, it is logical that we should apply the same philosophy of cooperation, research and promotion to the solution of the wiring inadequacy problem. In recent years important technological advances have taken place in insulating materials which have enabled manufacturers to develop greatly improved wiring materials. These new developments can aid sales promotion by making it possible to reduce unit costs while retaining the ever necessary level of safety.

Aside from the definite installations advantages found in thin wall insulated building wire and in covered neutral cable, for example, it should be remembered that a good new product often provides the necessary peg on which to hang an enthusiastic promotional activity that will succeed in building business where other attempts have failed.

These new materials now available have been proven safe by field experience and by laboratory tests. If past experience is a criterion, they will not completely supersede any material now on the market, but must find their level in competition with other cable assemblies and with type "R" Code wire. If they serve a definite purpose in opening markets now restricted, they will find a place in the economy of wiring materials, otherwise they will pass out of the picture.

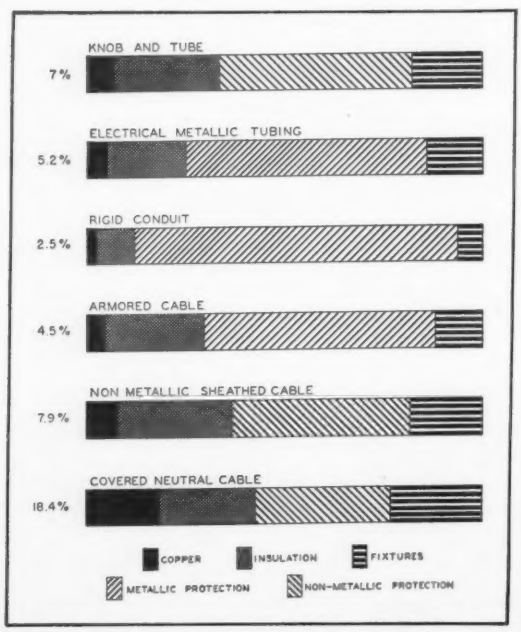

Fig. 1. This chart shows the relative amount of copper found in various common wiring systems in comparison with the amount of copper in covered neutral cable.

Specifically, the Code proposals fall into two groups, those which evidently are intended to increase markets, and those which appear to be policy points, but which it is believed actually will build business as well.

In the first group can be included:

1. Use of covered neutral cable in residences and buildings of frame construction.
2. Use of service cable of the covered neutral type for feeders and heavier circuits generally.
3. Use of duplex of the covered neutral type, in raceways.
4. Use of the uninsulated neutral in rigid steel raceways, particularly for rewiring.
5. Use of thin-wall insulated conductors for **rewiring** of existing structures.
6. Use of increased raceways fills beyond the normal 40% Code limit for rewiring.

In the second group can be included—

1. Permission to use systems other than rigid raceways in theatres, elevators, and hazardous locations.
2. Permission to use other than metal-clad wiring in garages.
3. Permission to ship conduit in other than 10 foot lengths.

In regard to the last group of three items the utilities in general believe that the Code has probably gone too far in its requirements without adequate proof of necessity for restricting itself to one or several materials. Usually the type of building construction employed will dictate the wiring material which is used. For instance, in concrete slab construction conduit or electrical metallic tubing normally would be employed. It is logical that such construction should continue. In the case of a frame building, metal or non-metallic cable systems are as usable as are raceway systems. Frame construction, particularly of commercial buildings, usually denotes that the owner wishes to economize, hence it seems unreasonable

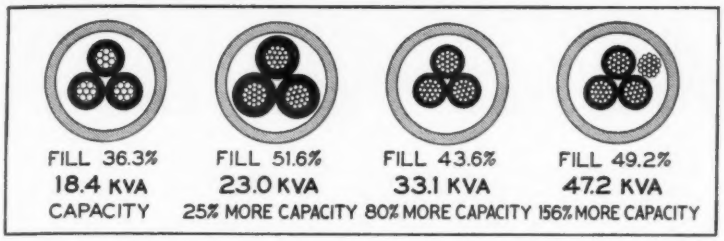

Fig. 2. The circuit cross sections indicate the increased feeder circuit capacity available through the use of thin-wall insulation. bare neutrals, and increased conduit fills. Numbering from left to right, the first diagram indicates present code maximum for 1¼-conduit, 18.4 kva capacity using 3 No. 3 AWG type R conductors, 3-wire, 115/230 volts, single phase. In the second diagram, 25% more capacity is obtained by increasing fill to 51.6% permitting the use of 3 No. 1 type R conductors. In the third diagram 80% more circuit capacity is obtained by using thin-wall insulated conductors having higher current carrying capacity, and by increasing fill to only 43.6%. In the last diagram, the introduction of a bare neutral and connection for 4-wire, 120/208 volt, three-phase operation increases circuit capacity to 47.2 kva, an increase of 156% over present code maximum.

to call for the most expensive types of wiring which do not carry added safety in proportion to the increase in cost. It is likely that if inexpensive cable systems could be employed, more permanent wiring would actually be installed due to a reduction in the unit cost. Hence there would be less tendency towards makeshift extensions after the building has been completed and turned over to the owners.

The requirement that conduit be shipped in 10 foot lengths is a workable and satisfactory commercial standard. However, it's place in the Code is questionable from the viewpoint of safety. It is found feasible to label short nipples, elbows and bends. It is equally feasible to label rigid conduit in various lengths, if any one desires to purchase it in a length other than 10 foot. When a large building is to be erected ceiling lighting outlets usually will be found spaced on certain predetermined centers. Where large quantities are involved, it is a definite advantage from the standpoint of economy in erection to purchase conduit of the exact length to meet the outlet spacing. Such conduit would seem to be just as satisfactory and safe as if purchased in 10 foot lengths and then shortened 6 inches on the job. The normal wholesaler and contractor stocks undoubtedly would continue to be 10 foot in length.

On the above points the utilities have received the Code critically from the standpoint of safety and believe certain of the requirements mentioned could well be liberalized and the use of the products in question actually increased.

Actually it is the first group of six proposals mentioned above which is important from the immediate market development standpoint. In the belief that the technical developments they present are a business advantage to the industry, the Edison Electric Institute has prepared three booklets explaining in detail the effect on the new residential market and on the market for rewiring of commercial and industrial buildings. These booklets are: "Basic Factors of Adequate Wiring," "Covered Neutral Cable Helps Sell Adequate Home Wiring," and "Commercial and Industrial Building Rewiring Market."

Wide distribution has been made to members of the International Association of Electrical Inspectors, the NFPA Electrical Committee, trade associations, the trade press and otherwise. These three publications were preceded by one which presented the technical proof that the proposals were safe, good engineering and proper material for inclusion in the Code. Reference was made to this document early in the discussion. It received the same wide distribution that have the other three.

Under the circumstances, it should not be necessary to review the effect of each proposal in detail. It would be interesting to consider a few rather startling facts presented by these books. Figure 1 shows the relative amounts of copper found in various common wiring systems contrasted with the amount of copper in covered neutral cable. Basically a good wiring method should meet the requirements of safety, of ample copper, of plenty of lighting switch and convenience outlets and of economy of installation. It is obvious that the copper in the system is the only item that conducts the current and in the last analysis it is this that the customer hopes he is buying.

Figure 2 indicates how the copper capacity in an existing 1¼" conduit can be increased beyond present limits when thin-wall insulated conductors uninsulated neutrals and increased conduit fills are employed. It illustrates how feeders in commercial buildings can be doubled and tripled.

Similarily, Fig. 3 indicates the

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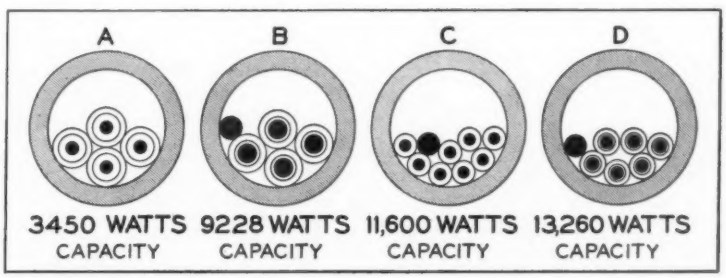


Fig. 3. These diagrams illustrate how branch circuit capacity may be increased. (A) 3,450 watts capacity is available from four No. 14 type R conductors connected as two circuits having 15 ampere capacity each, in a ½-inch conduit. (B) Conductor size increased to No. 12 (75 deg. C. insulation) with a bare neutral added gives four circuits having 21.6 ampere capacity each or a total capacity of 9,928 watts. (C) Number of conductors increased to eight No. 14 (60 deg. C. insulation) with a common bare neutral added gives eight circuits having 12.6 ampere capacity each or a total of 11,600 watts. (D) Number of conductors increased to six and size to No. 12 (60 deg. C. insulation) with a common bare neutral added gives six circuits having 18.4 ampere capacity each or a total capacity of 13,260 watts.

Understanding and Using the National Electrical Code

By B. Z. Segall

New Orleans Public Service, Inc.
New Orleans, Louisiana

THE maximum rating or setting of the over current device determines the circuit rating. Very often a larger wire size will be installed than is required for the particular circuit. For example a No. 12 wire may be used for a 15 ampere branch circuit. A No. 12 wire is rated for 20 amperes. However, as long as the 15 ampere fuse is kept in the circuit the branch circuit will carry but a 15 ampere rating.

Section 2114 establishes the basis for branch circuit classification.

There are, in all, five classes of branch circuits. It is most important to keep in mind that only the 15, 20 and 25 ampere branch circuits may be installed in a residence. Of equal importance is the fact that the 35 and 50 ampere branch circuits are applicable only to lighting circuits in other than dwelling occupancies. To emphasize these facts a code revision has been proposed to change the statement under the captions "35 ampere branch circuit" and "50 ampere branch circuit" to emphasize that these circuits may only be used for lighting circuits. In addition, the revision proposes to change the fine print note referring to section 4247 to indicate that it only applies when a 25 ampere branch circuit cannot properly protect the appliance.

If an appliance requires a greater overload protection than is afforded by a 25 ampere fuse it will have to be protected in accordance with the rules set up on Section 4247 of Article 422 on appliances.

It will be noted that any type of permanently connected lamp-holder,—heavy duty (mogul base or equivalent), medium, intermediate, or candelabra—may be connected to a 15 ampere branch circuit. However, only heavy duty lampholders may be permanently installed on the 20, 25, 35 and 50 branch circuits. A combination unit such as a heavy duty mercury vapor lamp combined with tungsten lamps with medium bases, can be used on these larger size branch circuits.

The 15 ampere branch circuit is the only circuit to which we may make taps for individual lampholders with wire smaller than No. 14. All the other circuits require the taps to be No. 14 wire or larger. The balance of the rules are very definite and concise and do not require any exposition of their intent and purpose.

Application of Requirements

To expedite the discussion of the branch circuit rules of Section 2107 they will be applied to the plan showing the two family dwelling in Figure 14. The total area of each apartment exclusive of the open porch and service room is 72 x 14 = 1008 equare feet.

The basic branch circuit wattage is equal to 1008 x 2 = 2016 watts. To this must be added the following appliance loads: kitchen, 500 watts; dining room, 500 watts; and laundry tubs, 500 watts. The total wattage for the branch circuits will be the sum of the above four items or 3516 watts.

To obtain the total current requirement for the branch circuits this total wattage is divided by the nominal branch circuit voltage. The code uses 115 volts in all its calculations so that Current = Watts/115 or 3516/115 = 31 amperes.

Most of the outlets will supply medium base lampholders. These lampholders may be connected only to 15 ampere branch circuits. For the above load there would be required, therefore, a minimum of three 15 ampere branch circuits. Two 15 ampere branch circuits would supply only 30 amperes, but 31 amperes are needed so that a third branch will be necessary to take care of the extra one ampere.

The code specifies also a minimum number of receptacle outlets (Section 2110). This rule applies to the living room, dining room, kitchen and bedrooms shown in Figure 14. Four of these rooms are 12 feet by 14 feet. The horizontal distance around each of these rooms is (2 x 12′) plus (2 x 14′) or 52 feet. An outlet for every 20 feet would require 52/20 or 2.6 outlets for each room. Therefore, each bedroom, living room and dining room in this house will have to have a minimum of 3 outlets. These outlets will have to be so spaced as to have between them no more than 20 feet distance, as measured along the horizontal periphery of the wall. (See Figure 12, part V, in August 1939 issue.)

The kitchen has a total horizontal wall distance equal to (2 x 10′) plus (2 x 14′) or 48 feet. Two outlets would have a spacing of 24 feet between them so that three outlets are also required in the kitchen.

Finally, this section requires that a receptacle outlet be installed wherever a location has been set aside for laundering. The service room shown on the plan in Figure 14 would require an outlet for this purpose.

Figure 15 shows the same plan of Figure 14 with all the minimum branch circuits and outlets required by the code. It should be noted that the sixteen outlets have been more or less equally divided between the three circuits as required by section 2109. It is also significant that the code does not require the installation of any other outlets such as ceiling lighting units, wall brackets, etc.

A cursory examination of Fig-

IN this sixth article of his series on the code, Mr. Segall continues a discussion of Article 210. So much interest has been exhibited in this part of the Code and its scope is so great that several installments in this series have been devoted to this single article. Others appeared in the July and August issues.

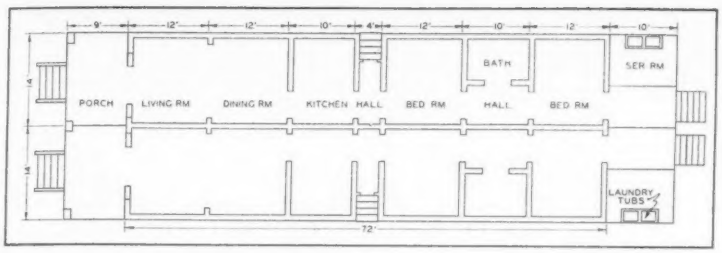


Fig. 14. Floor plan dimensions for typical two-family dwelling.

ure 15 will show that such a wiring plan, while definitely fulfilling all code requirements, does not present a well engineered or a practical layout. It is quite possible to eliminate all overhead lighting in the living room, dining room, and bedrooms and depend entirely on floor lamps and table lamps. However, the lack of centralized switching for these lamps will create both a hazard and an inconvenience. The hazard is quite evident when we consider that the first lamp will have to be lit by groping for its individual switch in the dark. The inconvenience of controlling these lamps by their own switches rather than a switch installed in a centralized permanent location is also quite evident.

Code a Minimum Standard

The kitchen of necessity should have an overhead fixture. The bathroom and hallways are entirely without illumination so that lighting will have to be provided for these sections of the residence. No lighting provisions are made for the porch or service room. It is well to emphasize once more that the wiring installation shown in Figure 15 while fulfilling all code requirements does not adequately provide for even minimum comfort or convenience.

There is another consideration that is quite often overlooked, Section 2108 states that "the minimum number of branch circuits shall be determined from the total load computed by section 2107 . . . but the *number of branch circuits shall, in every case, be sufficient for the specific load to be served.*" (The italics are ours.) It is necessary that any specific load requirements such as air conditioning motors, attic fans, electric ranges, electric hot water heaters, extra floodlighting for yards or any other special requirements set up in the specific plans for a residential occupancy, be added in to the minimum load requirements of Section 2107 to obtain the total branch circuit loading for the dwelling.

The fine print note in section 2109 is very important although it is only a recommendation and not a specific mandatory rule. The laundry tub receptacles, the kitchen receptacles and the dining room receptacles should be installed on a separate circuit. These receptacles are utilized to the greatest extent in a home and the circuit feeding these outlets is the one which becomes overloaded more often than any other branch in the home. Many specifications now require a separate 20 ampere circuit feeding only the laundry and kitchen outlets. In fact one of the new revisions recommended for the 1940 code by the I.A.E.I. establishes a mandatory rule requiring a special No. 12 wire circuit feeding only the receptacles in the kitchen pantry, dining room, or breakfast room. It will be noted that the laundry receptacles have been omitted entirely from this latter circuit.

Another proposed revision would change the two (2) watts per square foot requirement in Section 2107a to a three (3) watt minimum. It is quite interesting to note that the fine print note at the end of Section 2107 recommended such a minimum wattage value. To clafiry the wording of Section 2107a3 it has been recommended that the 1940 code read "Each receptacle in a laundry location, 500 watts."

The method of determining the floor area of a dwelling does not include any reference to the number of floors in the building. Actually it is understood by most contractors and inspectors to mean that the two story dwelling area having two floors of equal outside dimensions is twice that area computed according to the first paragraph on page 27 of Section 2107. However, to be consistent with the feeder and service requirements of Section 2202 and Table 17, which do make a direct reference to the "number of floors" in the area calculations, a change has been recommended for 1940 to include a similar reference in the aforementioned paragraph of Section 2107.

Small Home Discussed

The final requirement of Section 2107a is quite interesting. Figure 16 shows a single-family residence having less than 500 square feet floor area. The inside dimension of each room is approximately 9 feet by 12 feet. The total floor area is equal to 29 x 13 or 377 square feet. The minimum wattage for branch circuits is 377 x 2 = 754, plus an allowance of 500 watts for the kitchen, or a total of 1254 watts. One 15 ampere branch circuit can take care of 15 amperes times 115 volts or 1725 watts, therefore, only one circuit would be required for the above load.

Each room has (2 x 9) plus (2 x 12) or 42 feet horizontal distance around the walls. Three receptacle outlets, therefore, are required for each room according to the rule of Section 2110. In addition, a ceiling outlet is to be installed in each room for general illumination. There are in all twelve outlets on this one circuit

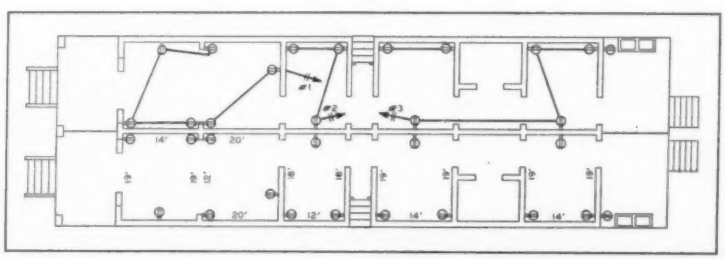


Fig. 15. Floor plan of Fig. 14 with minimum branch circuits and outlets required by present Code.

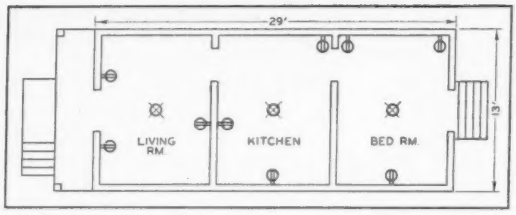


Fig. 16. Floor plan and typical circuit layout for small single family residence having less than 500 sq. ft. in area. Note that although a total of 12 outlets are installed, the Code requires only one 15-ampere branch circuit.

for this home.

The final rule of Section 2107, offers an optional method for calculating branch circuits for a dwelling of the type shown in Figure 16. Load calculations may be made by assuming a minimum load for each outlet in accordance with the table set up in section 2107b. If the outlet will supply heavy duty lampholders then a minimum of 5 amperes load will have to be assigned to the receptacle. All other outlets may be assumed to supply a minimum load of 1 1/2 amperes. These are minimum values and actually must be assumed large enough to take care of the connected load. For example if a 750 watt torchiere lamp is to be plugged in to one of the living room outlets, or if a 1000 watt indirect fixture is to be set on the ceiling outlet then the load on these outlets must be assumed at 7 1/2 amperes and 10 amperes, respectively, and not 5 amperes.

For the purpose of comparison it will be assumed that all outlets in Figure 16 supply medium base lampholders and light duty appliances rated at 1 1/2 amperes or less. As shown by the drawing, there are 12 outlets in the building. At 1 1/2 amperes per outlet the total branch circuit load is 1 1/2 times 12 or 18 amperes. A two circuit installation, i.e. two 15 ampere branches, will have to be installed to take care of the load, instead of the one circuit job which was obtained in the first calculation in the above discussion.

The significant difference between the two methods of calculations is to be found in the limitation of the number of outlets which may be installed on a circuit. There is no limit to the number of outlets that may be installed on a circuit obtained by calculation as set up in Section 2107a. There is a definite limit to the number of outlets to be placed on a circuit developed by the calculations of Section 2107b. A maximum of 3 heavy duty or 10 medium base lampholders or outlets can be installed on a 15 ampere branch circuit. Four heavy duty or 13 medium base lampholders is the maximum for a 20 ampere circuit, and 5 heavy duty or 16 medium base outlets may be installed on a 25 ampere circuit.

Section 2107b1 modifies the table set up in the first part of 2107b outlining the minimum loading to be assumed for each outlet. The inclusion of this rule at this point in Section 2107 would seem to indicate that multi outlet assemblies are recognized only for non-residential occupancies. However, the installation in residences of such material as Wiremold "Plug-Mold", National Electric Products "Plug-in-Strip", etc., has been highly recommended and approved. It is felt that some clarification should be made of the full intent of this rule. The I.A.E.I. has proposed that a new definition be included in the 1940 code covering the types of assemblies intended to be included in the term "multi-outlet assemblies."

There has been considerable controversy as to the application of Section 2107c. New circuits may be added to existing installations in accordance with either method set up in section 2107. The floor area of the new extension may be added to the existing floor area and the branch circuit load calculation can be made as outlined in Section 2107a for the entire enlarged area. Then again the new outlets may be added to an existing circuit by rating each outlet as outlined in Section 2107b. It must be remembered that the method of calculation set up in 2107b establishes a definite limit to the number of outlets which can be installed on any one type of circuit.

Any extension, therefore, that is made to an existing circuit must not increase the number of outlets on the circuit beyond the limit of the current capacity of the circuit.

A revision has been proposed to set up this rule in Section 2107c in two parts. The first portion of this new rule will deal with extensions in dwelling occupancies. The new rule would allow extensions or new circuits on existing installations to be made in accordance with the sub paragraphs "a" or "b". However, if any additional new structures or previously unwired existing portions of the dwelling exceeding 500 square feet in area are to be wired, then the calculations must be made in accordance with Section 2107a. For other than dwelling occupancies section 2107b will apply.

Before concluding this discussion on branch circuit calculations there are several other rules which should be explained and illustrated. These apply more directly to commercial and industrial occupancies and will be discussed in connection with the wiring of the store plan shown in Figure 17. The specifications for this installation call for branch circuit switching and medium base fixtures for the show windows.

(*Continued on page* 66)

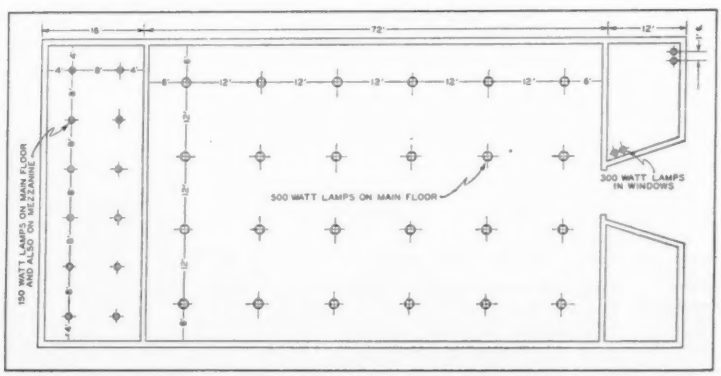


Fig. 17. This store floor and outlet plan is used as a basis for a discussion of Code requirements for branch circuits.

ENGINEERING SECTION

Substation Maintenance Trailer Designed for Efficiency

By W. W. Ochsner

Substation Engineer
Southwestern Light & Power Co.
Lawton, Oklahoma

WHEN the Southwestern Light & Power Company found it necessary in the latter part of 1938 to replace the major portion of the equipment then in use for the maintenance of oil insulated transformers, oil circuit breakers, and other electrical apparatus in distribution and transmission substations, a specially designed motor truck and trailer was equipped to provide a complete substation maintenance unit having a high degree of portability and to permit a wide range of maintenance operations by the regular maintenance crew of two men.

This company operates in southwestern Oklahoma and serves a territory which is primarily agricultural. Their transmission system consists of approximately twelve hundred miles of transmission lines, most of which operate at 66 KV or 33 KV, and 125 small and medium capacity substations, all of which, except one, have an installed transformer capacity of less than 7,000 KVA. Due to the small size of the stations and the low load density of the territory served, the maintenance work in the substations is carried on by a traveling crew which consists of two regular men with additional help only during emergencies.

Duties of Maintenance Crew

The general duties of this crew consist of the filtering and reconditioning of the insulating oil in oil-filled transformers and oil circuit breakers, inspection and maintenance of the breaker operating mechanisms and contacts, removal of sludge or other foreign matter from the interior of transformer tanks and cores, maintenance of air break switches, fuse mountings, and other miscellaneous station equipment, repainting of all station apparatus, and making of minor improvements or changes in the equipment.

To enable this small crew to perform the various tasks, a large amount of equipment and tools are required, all of which must be readily portable, and capable of withstanding the extreme weather conditions met with in this territory.

This equipment consists of the following major items:

One and one-half ton truck equipped with power driven winch.

Two-wheel, semi-trailer chassis with completely enclosed metal body.

Oil filtering and reconditioning equipment.

Two-cylinder, motor-driven air compressor and air storage tank.

Steel pole derrick with mounting attachments on the truck.

Oil storage tanks.

15 kva transformer rated 13,800-6900-2300/220-110 volts.

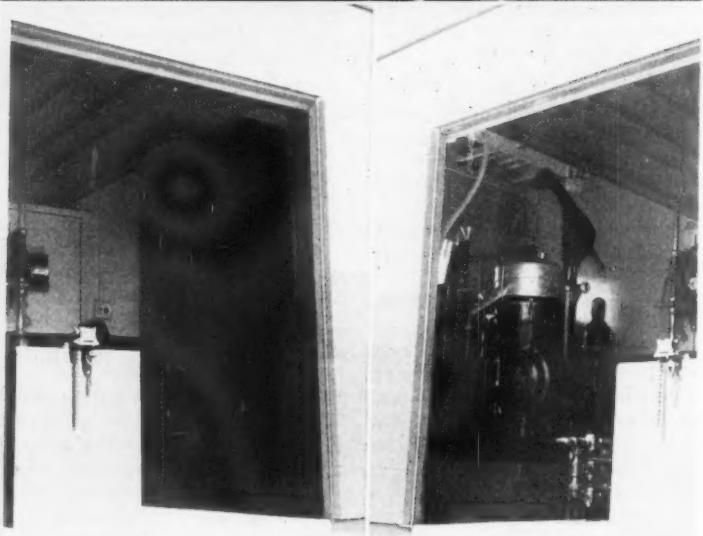
The trailer is of the drop-center type, with dual rear wheels and equipped with air brakes. The trailer body with built-in features was designed by the Engineering Department of the Southwestern Light & Power Company and built by one of the larger trailer manufacturing companies. The overall length of the trailer is 21 feet, the overall width is 8 feet, and the height from floor to roof is 9 feet. The overall clearance required above road is 10 feet 6 inches. A five foot double opening door is provided on each side and rear of the body, making the equipment fully accessible when the doors are open, and completely protected with the doors closed and not in use.

Built-In Tanks Provided

Two one hundred gallon and one two hundred gallon oil storage tanks are built into the front end of the trailer body. Each tank is equipped with a magnetic type oil level gauge. Immediately above the larger tank is mounted the 15 kva transformer with the high voltage leads extending to the outside through the two 15 kv transformer bushings mounted in the roof.

Electric service for the trailer may be obtained either from an external high voltage source through the transformer, or from an external low voltage source by means of a heavy duty receptacle

Exterior view of the truck and trailer which provides complete maintenance facilities for 125 small substations.



At top of page is a view of trailer looking directly into the rear door. Oil purification equipment is located directly inside rear door and oil hose is to be seen extending from trailer. At left center is a view through one of the side doors showing storage bins. The oil centrifuge and part of the work bench is shown at right center. Below, pole derrick in place.

which is mounted in one wall of the trailer, and a long portable cable. A heavy duty three pole contactor is connected to the low voltage side of the transformer, and one to the receptacle with suitable interlocks to prevent both contactors being closed at the same time. An additional contactor and receptacle are provided to allow connection to the air compressor by means of a short cable. All contactors and an integrating watthour meter are mounted on a small metal panel near the transformer.

Built-in steel shelving, steel cabinets and lockers are mounted on either side of the body between the doors and the space occupied by the transformer and above the small oil tanks, leaving a passageway 36 inches wide for access to the shelving or to the transformer. The air compressor, driven by a 5 hp single phase motor, with the air storage tank, is mounted on the truck above the power driven winch. The compressor is equipped with automatic pressure unloading device and requires no attention after starting.

The oil purifying equipment consists of a combination centrifuge and blotter press with a rated capacity of 900 gallons per hour when using both units. This is mounted in the rear part of the trailer, directly in front of the rear door, and has the usual piping arrangement so that oil may be pumped through either or both of the purifying units, or may be pumped directly from the suction to the discharge line. In addition to this, any of the three oil storage tanks may be connected to either the suction or discharge side of the machine by means of three-way valves mounted at the front end of the unit.

The suction and discharge lines of the machine are located at the rear, one on each side with an oil meter installed in the discharge line. Two one hundred foot lengths of special oil resistant hose are carried on specially built hose reels, one reel being mounted on each side of the purifying equipment. The inner end of each hose is permanently connected to the purifying equipment through a swivel joint on the hollow spindle of the reel, and the outer end of the hose is carried through a suitable guide to a supporting bracket mounted near the rear door of the trailer. Thus, to connect the equip-

(*Continued on page* 68)

Complete Lightning Strokes Recorded by New Device

WITHIN 24 hours after the engineers had made final preparations for the reception and "entertainment" of lightning on the roof of the 42-story Cathedral of Learning of the University of Pittsburgh, a direct stroke of lightning was received and fully recorded. Its presence gave Westinghouse engineers two opportunities they had been eagerly awaiting—to try their newly developed device for recording a current in a lightning stroke throughout its entirety and to determine if a new type of lightning arrester can withstand direct strokes.

Both opportunities were realized with complete satisfaction. A direct stroke of lightning—for the first time—was recorded in its entirety, including the initial high-current surge and the long-lasting, low-current tail.

The full current of this stroke passed through a standard Autovalve lightning arrester with no damage to the arrester. This also is the first known instance of a lightning arrester experiencing a direct stroke without injury.

The lightning observation station on the roof of the Cathedral of Learning is but one of several established over the country, in regions of greatest lightning severity. This is part of an extensive investigation of direct lightning strokes, and makes use of a new, automatic surge-recording device of a rotating type, recently developed by Westinghouse.

Operating Principle

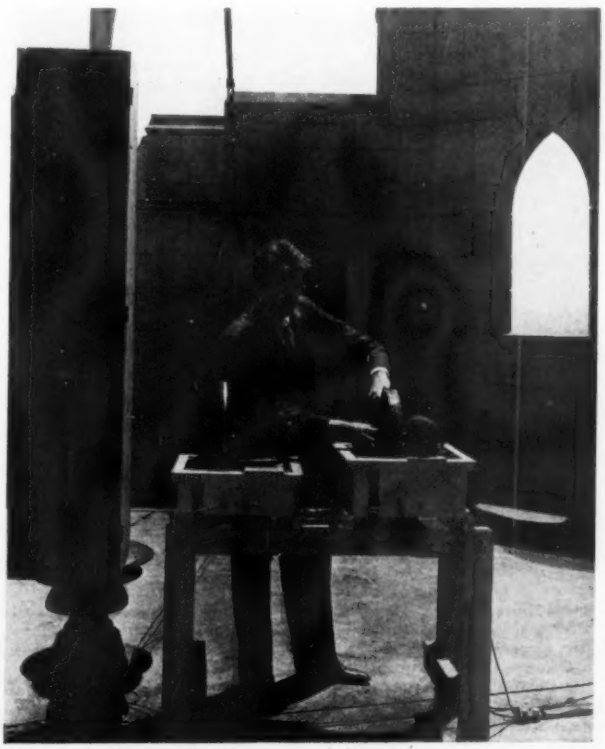
The new device which has been named the "fulchronograph" consists of a motor driven disk whose rim passes through a field created by the surge current. Fastened to the rim of the disc is a large number of flat magnets of special steel, each of which is magnetized to a degree proportional to the current in the surge at the time the magnet passes through the field. The fulchronograph is capable of recording with accuracy the range of current from 80 to 150,000 amperes. The disc of one unit is driven at high speed to record a complete surge on a relatively extended time scale. The disc of the other is driven at slow speed and records multiple strokes. The wheels stop automatically after the passage of the surge.

Other Stations Established

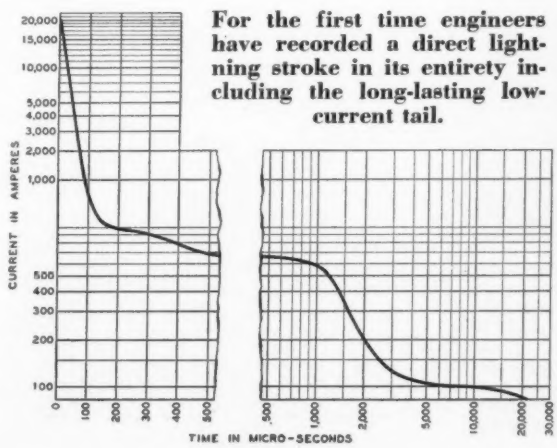
Investigation stations have been placed on the power lines of four major utilities in the southeastern part of the United States. These were carefully selected as being in regions of particularly severe lightning activity and as having lines providing high insulation strength in order to obtain the worst conditions of surge as far as electrical apparatus is concerned. Nineteen stations have been placed on these lines, which cover a range from 4600 volts to 110 kv. They include a total of 40 of the rotating recorders.

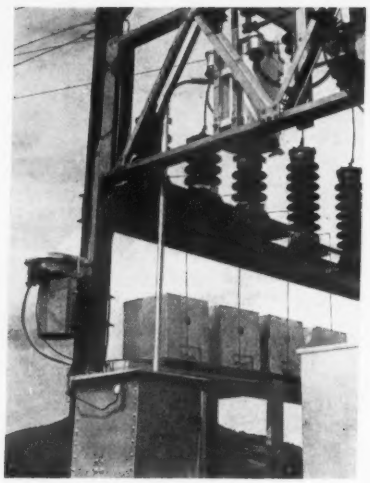
In addition are the two units on Cathedral of Learning, four units installed at the radio station KDKA transmitter at Saxonburg, Pa., and twelve more expected to be located soon on the lines of utilities in the north central region. The total number of surge

Gilbert D. McCann, Westinghouse lightning engineer, is shown adjusting the recording wheel of the newly invented fulchronograph which successfully measured the current in a direct lightning stroke to the top of the 42-story University of Pittsburgh Cathedral of learning. The lightning observation station on the roof of the University is only one of several being established throughout the country where lightning is severe.



For the first time engineers have recorded a direct lightning stroke in its entirety including the long-lasting low-current tail.





With their wheels whirring softly, these four Westinghouse fulchronograph surge recorders lie in wait for lightning at the Huntington Court, Roanoke, Va., substation of the Appalachian Electric Power Company. This is one of three such stations installed on the lines of this company as a part of widespread study by Westinghouse of natural lightning. One high-speed fulchronograph is placed in each phase and one low-speed fulchronograph in the neutral.

recorders located at stations widely distributed over the eastern half of the United States during the present lightning season will be well over 60.

The development of a simple, relatively inexpensive surge recording device is definitely a long step forward in the march to lightning-proof lines and equipment. Many records of complete lightning strokes can now be obtained in a short time. With the knowledge of the full characteristics of lightning, builders of lines and protective devices are greatly aided in their efforts to create systems invulnerable to direct strokes.

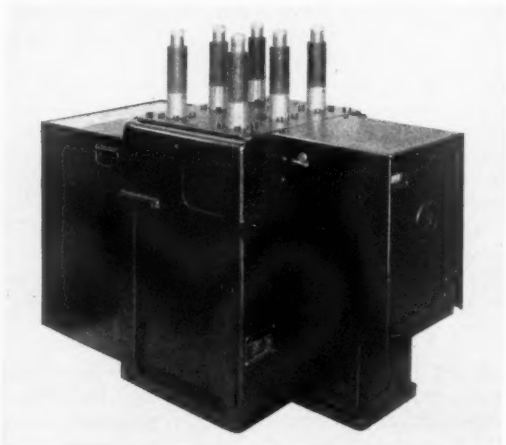
New Air Circuit Breaker Described

An air circuit breaker for 5000-volt service, combining the basic principles of magnetic action and thermal reaction, was described by E. W. Boehne and L. J. Linde, engineers of the General Electric Company, in a paper presented at the combined summer and Pacific Coast convention in San Francisco of the American Institute of Electrical Engineers.

Named "Magne-blast," the new breaker is intended for general applications in switching, controlling, and protecting 2300 to 500 volt circuits, according to Messrs. Boehne and Linde. They described the tests which have been made on the breaker and stated that results have shown it to possess the best advantages of both the air and oil type breakers.

"The Magne-blast breaker offers a solution to the problems of size, flame, and disturbance inherent in previous air circuit breakers while retaining every advantage," they said.

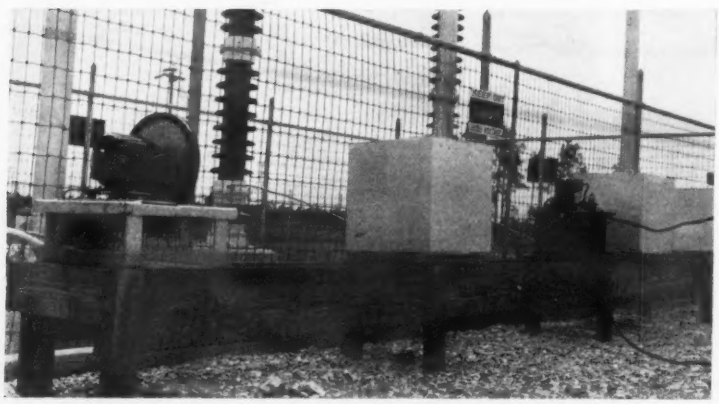
An important design feature of the new breaker is an interleaving chute formed by long, tapered fins alternating from either arc chute wall and extending from the throat and arc runner to the mouth of the arc chute. The arc is cooled and lengthened in the interleaving chute, adding resistance to the circuit as the arc is extinguished. Rates of rise of recovery voltage are held to a harmless value, they said.



Many advantages are claimed for this new air circuit breaker described at the summer meeting of the A.I.E.E. in San Francisco.

Tests have shown that the breaker offers long and economical life, reliable circuit control, and a reduction of hot gases and disturbances when interrupting high currents, it was maintained.

"The compact arrangement of the breaker loses no advantage when used in metal-clad switchgear equipments," they stated. "Because the breaker does not exhaust hot gases beyond its barriers, it can be used in the same manner as oil circuit breakers. Breaker compartments can be of metal with standard mechanical clearance. The breaker mechanism, control accessories, and secondary couplings are conveniently accessible from the front of the metal-clad equipment.



One of the many fulchronograph field installations in the southeastern states is shown here. This recorder is installed at the 110 kv Gulfport substation of the Mississippi Power Company. "We believe that the data which should be obtained from this equipment will be very valuable to the electrical engineer," reports S. L. Muths, operating manager, of the Mississippi Power Company. "There is no doubt but that it will give the manufacturers of protective equipment much information on the intensity as well as the characteristics of lightning surges which has not been available in the past and which, of course, is an appreciable factor in the design of protective equipment."

READER Comment

How Best Compensate the Appliance Salesman?

An article in the May 1939 issue of ELECTRICAL SOUTH describing the appliance sales activities of the Hutto Electric Company of Jasper, Alabama, mentioned that dealers' plan of compensating salesmen by paying them a straight 10% commission on all sales; 5% of which was paid at the end of the week and the balance apportioned over a five month period. The idea behind the reserve was to protect salesmen during off seasons and slack months. Several readers have commented on this plan—their letters follow:

●

To the Editor—Sir: Referring to the article which you published with regard to the Jasper, Alabama, dealer's method of compensating salesmen, I think he is on the right track, since I believe that it is part of every salesman's job to be a good "credit man," and that, to prevent an unscrupulous salesman's slipping in weak credit deals with falsified credit statements, there should be some sort of recourse on the salesman on credit deals, at least for a period of time.

Since the salesman has already drawn one commission on the sale of the article, I think it is his duty to sell repossessed items without commission, since the dealer has taken the hazard of tying up his money in it, to the extent of paying the salesman his full commission at the time of the original sale, and has taken the chance of having the credit go bad on him. To this end, a deduction from commissions paid at time of original sale is very necessary, just as the major finance companies establish a reserve for dealers whose paper they buy, and this reserve will insure the dealer of some recourse on the salesman if a deal goes bad, so that he will be sure of his cooperation in re-selling the article.

I do not see any reason for holding back a full half of their money however; we pay our men in full, and it encourages them to work hard while the season is right, and enables them to make good use of their money while they are earning it.

George D. Hunter
Roanoke's Pioneer "GE" Man
Roanoke, Virginia.

●

To the Editor—Sir: In my daily work with all types of merchandisers I find the common problem to be lack of retail men who are really productive assets.

After careful study, I am convinced that there must be a contract entered into by the dealer and his salesmen, agreeable and profitable to both. Most salesmen can't be made to realize the advantages and possibilities that retail selling will offer and, therefore, must be shown by the dealer in a monetary way in the form of a fixed salary.

My study of the selling problem brings me to the conclusion that a compensation plan of $100 per month plus a 5% commission on the sale of all merchandise, minor or major handled by the dealer, would be profitable for dealer and salesmen alike. Where the potential market offers $3000 or more per year to productive retail men, you will readily see that on this basis the salesman will make a livable wage and the dealer will save $50 over the accepted 10% commission.

By the offer of a set salary of $100 per month the dealer is able to go to grocery stores, shoe stores, or any retail outlet and offer outstanding men clerks a better job with an unlimited future. Men could also be selected and trained from manufacturers' recommendations and quota buster clubs.

Curtis Logan
Westinghouse Electric Supply Co., Tampa, Fla.

To the Editor—Sir: We read with interest an article in a recent issue dealing with the plan used by the Hutto Electric Company for compensating salesmen, and are wondering if this system isn't adaptable strictly to that particular town and market.

The final aim of any system of compensation is simply to pay the salesmen adequately for adequate work, so that they and the company may profit alike. Naturally, market potentials play an important part in determining the mechanics of such a plan. Where a new territory is being opened up for electricity, there is a far greater sales potential than in places which have been electrified for years, and where there are many established appliance dealers.

Consequently, sales are harder to get, and the salesmen must be paid more for getting them. The last few years have seen a marked increase in replacement and trade-in sales, and a great decrease in the straight sales of new appliances. The trade-in situation certainly must be taken into consideration in any plan for rewarding salesmen in such a territory.

Few appliance salesmen in Austin, or, I would venture to say, in any town of like size and market conditions, can average more than $1,000 worth of sales a month. Accordingly, we take into consideration that probable year-round average, and pay them 10% commission on the first $500 worth of sales each month, and 12½% on all sales over that figure.

We don't see how a salesman can live on 5% of his past sales during a slack season; if he can, he's too good a salesman to stay on such a job. It seems to us that it is the job of the dealer to arrange his merchandising so that there will be no slack season, to take on lines of merchandise some of which are active in each season. Further, we don't believe our men would work optimistically under an arrangement which held out half of their pay; they feel competent to handle their own finances, and would resent having it held out. They usually need their full commissions each week.

We believe that appraisal of credit deals should be in more competent hands than those of a salesman. We, and our finance company, approve deals of this sort, and our finance company has a system of reserves which provides for the contingency of re-

possessions; the salesman should be left out of it. With all the plans of recourse and non-recourse financing that the big finance companies have to offer, we see no season for putting that burden on the salesmen. When we and our finance company have approved a credit deal, the salesman is paid his full commission, and he is then out of it.

The trade-in problem cannot be emphasized too much in planning for salesmen's compensation. We pay full commission only on goods sold without a trade-in. When articles are taken in trade, their allowance is deducted from the figure upon which the commission is computed. The salesmen must then help to move the article traded in before he realizes his full commission. Unless some of the bonus of moving traded merchandise is placed on the salesman, the dealer will soon find himself with too great an investment in second-hand goods.

This plan has the effect of causing the salesmen to work *with* us, and has no offensive "paternalism" about it. I should add that when we do have a repossession under a recourse note, our men feel a moral responsibility about it, and bend every effort to re-sell the article. This cooperative attitude, we believe, is a result of our policy of laying the cards on the table with the man, and letting them see that it is our aim to sell merchandise together, at as great a profit to both them and us as possible.

A. V. Nelson, Sales Mgr.
Burnette Sales Company
Austin, Texas.

●

To the Editor—Sir: We believe that a reserve against repossessed merchandise must be retired out of commissions paid appliance salesmen, but we feel that the size of this reserve should be governed by the job that it is expected to do. In other words, the purpose of the reserve is to force the salesman to refund the company commissions paid him on sales which did not work out for the company; therefore, when a reserve adequate to that purpose is retired, why deduct any more? The salesmen are the best judge of how to apportion their finances over the various seasons, and

(Continued on page 66)

Connecting Diagrams for Lap Wound Motors

Part 3

By A. C. Roe

Railway Motor Engineer
Westinghouse Electric & Mfg. Co.

THE preceding article of this series presented the four pole parallel, single voltage diagrams and described the method of numbering the pole phase groups. In this article, we present the two and four parallel, dual voltage diagrams, Figures 7, 8 and 9 and will describe how to use the numbers at each end of the pole phase groups.

After all the coils have been wound in, the next step is to separate the coils into pole phase groups and connect these coils in series. With small motors using partly closed slots and mush wound coils, the coils are wound on gang moulds in complete pole phase groups, thus each group has only a starting and finishing lead.

With open slot motors, however, the coils are separate and we have twice as many leads as coils. In some cases, there are phase coils, that is, coils that have additional insulation on the ends. There should be a phase coil at the beginning and ending of each pole phase group. These phase coils are generally marked either with red tape or red paint at the lead end, or both leads are longer than the other coil leads. In some cases, only one lead is longer or half the phase coils have the starting lead long, and the other half have the finishing lead long.

Thus the first step before starting to insert the coils is to check for phase coils and sort the coils by type. The coils are sorted out into two or three piles as plain coils, phase coils, or long top lead phase, and long bottom lead phase coils. In such cases, we must know the number of coils required for each pole-phase group.

This is simple when all groups have an equal number of coils, for example a 3 phase, 6 pole motor having 72 coils. There are 72 divided by 18 or 4 coils per group. But with 54 coils, 3 phase, 4 poles, there are 6 coils left over or two extra per phase, which means 6 groups of 4 coils each and 6 groups of 5 coils each. The proper locating of these odd groupings is beyond the scope of this article, but all combinations are given in table form in the book "Repair Shop Diagrams" by Braymer and Roe.

After "stubbing up" or connecting all coils in series in each pole phase group, we select the proper diagram, locate the best section for bringing out the line leads, locate group No. 1 and bend the lead at the left hand side of this group down towards the center of the motor. Then bend the finishing lead of this same group up, or away from the center.

Thus we have the top lead of group number one bent down and the bottom lead bent up. Proceed around the winding, bending all top leads down and all bottom leads up. Next, check the diagram, which we will assume is Fig. 7, and then make 16 small tags marked with a symbol as shown at the

●

THIS is the third article in a series that will present 45 modern connecting diagrams for two- and three-phase lap wound induction motors for use on four, six and eight pole windings.

A master table of the 45 diagrams was presented in the July 1939 issue together with the first three diagrams of the series. Figures 7, 8 and 9 of the series appear in this article together with additional explanation of construction and use of the wiring diagrams.

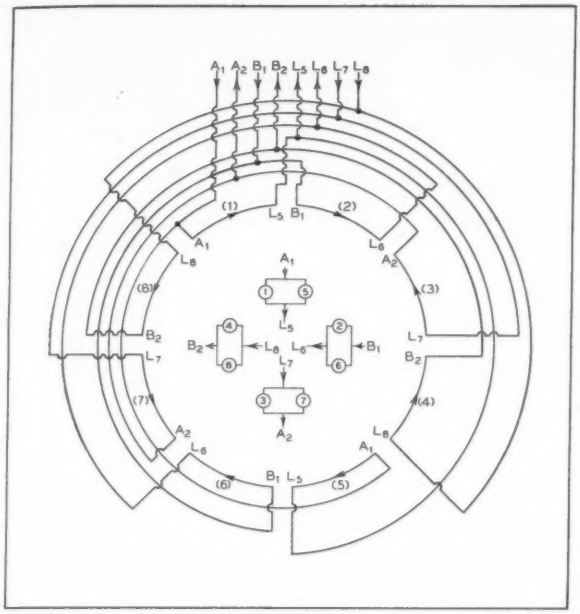


Fig. 7. Diagram for 4-pole, 2-phase with 8 leads for two parallel or four parallel connection. For eight leads bring out A_1, A_2, L_5 and L_7 for A-phase; and B_1, B_2, L_6 and L_8 for B-phase. For two parallel connections connect A_1 and A_2 to A-phase lines; B_1 and B_2 to B-phase lines; connect L_5 and L_7 together; and connect L_6 and L_8 together. For four parallel connection connect A_1 and L_7 to A_1 line; connect A_2 and L_5 to A_2 line; connect B_1 and L_8 to B_1 line; and connect B_2 and L_6 to B_2 line.

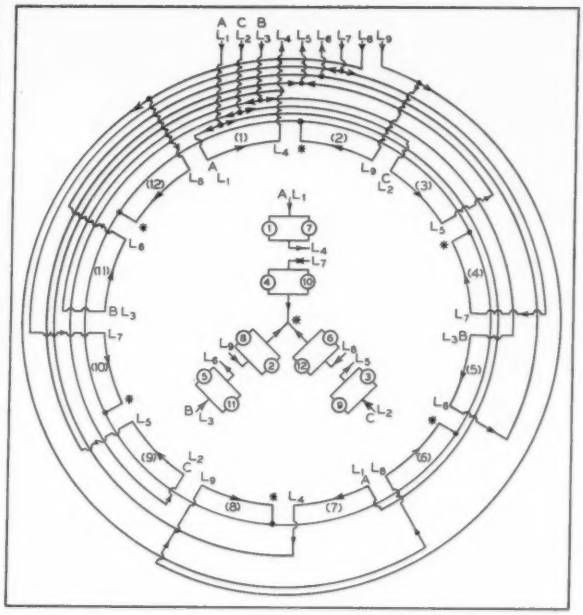


Fig. 8. Diagram for 4-pole, 3-phase, with nine leads for two parallel star or four parallel star connection. Bring out nine leads: A, L_4 and L_7 for A-phase; B, L_6 and L_9 for B-phase; C, L_5 and L_8 for C-phase. For two parallel star connection connect A, B and C to lines; connect L_4 and L_7 together; connect L_6 and L_9 together; and connect L_5 and L_8 together. For four parallel star connection connect A and L_7 to A-phase; connect B and L_9 to B-phase; connect C and L_8 to C-phase; and connect L_4, L_5 and L_6 together.

ends of the pole phase groups, as A1, L5, B1, L6, etc.

With the marked tags, start at the top lead of group 1 and attach the A1 tag, then attach the L5 tag to the bottom lead of group 1. Next, tag B1 is fastened to the top lead of group 2, and tag L6 to its bottom lead. This is repeated until all top and bottom leads have been tagged to match the diagram.

The next step is to connect like numbers together, as 1 to 1, 2 to 2, etc., with cable, or in the case of phase coils with long leads, to be used as jumpers. In Fig. 7, we connect A1 of group 1, to A1 of group 5, and bring out a lead marked A1 as shown. Likewise we connect L5 of group 1, and L5 of group 5 together, and bring out the L5 line from these two group leads. This is continued until all tags have been removed.

From the foregoing it is obvious that the system employed to mark the pole phase groups in these connecting diagrams is of great importance, as one can make up a set of tags that any intelligent helper can use to connect a winding. The winding can be made ready and then after tagging, an experienced winder can check their application against the diagram.

Small fiber tags about 3/4″ or 1″ in diameter, 1/16″ thick, with a small 1/8″ hole drilled near one edge are the best type of tags to use. A small board with pegs can be made to hang the tags on when not in use. Use steel stencils to mark the tags. Make up about four each of those most com-

(*Continued on page* 66)

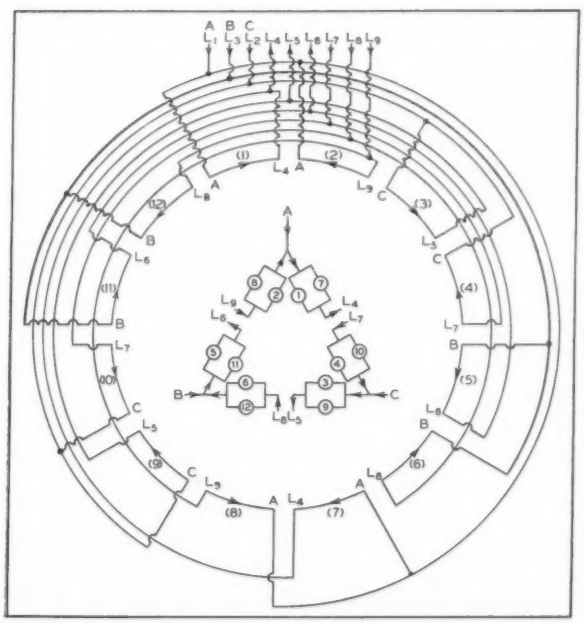


Fig. 9. Diagram for 4-pole, 3-phase, with nine leads for two parallel delta or four parallel delta connection. Bring out nine leads: A, L_4 and L_7 for A-phase; B, L_6 and L_9 for B-phase; and C, L_5 and L_8 for C-phase. For two parallel delta connection connect A, B and C to lines; connect L_4 to L_7; connect L_6 to L_9; and connect L_5 to L_8. For four parallel delta connection connect A, L_8 and L_7 to A-phase; connect B, L_5 and L_9 to B-phase; and connect C, L_4 and L_3 to C-phase.

APPLIANCE Service

Oil Separator Application Deserves Consideration

By Allen Parker

MOST service engineers probably have never given much thought to the use of oil separators on small refrigeration equipment because there did not appear to them to be a definite duty for the separator to perform that was not already being taken care of satisfactorily. However, there are enough installations on record where the use of oil separators have solved some difficult problems on jobs that were sluggish in refrigerating, or robbing themselves of oil, to indicate that these devices should receive some consideration from the service engineer.

The oil separator is not a new "gadget." Separators have been in use almost since the innovation of the compression type refrigeration machine but early models, of course, were far more simple and less efficient in design in comparison with the separators on the market today.

In early days, oil separators were simple traps in the line provided so that oil might accumulate and be drawn off at intervals by means of a hand valve so that the oil could be reclaimed and reused. It was important to prevent the oil from getting trapped in the cooling coil where it would not only fail to do a useful job but would reduce the efficiency of the refrigerant.

With the development of modern small automatic refrigerating equipment, oil separators were not included as standard equipment. While there were probably several reasons for this, the most important was that an automatic oil separator was not available and, of course, it would not be practical on these automatic machines to have an attendant bleed the oil back into the low side ever so often.

Then too, little was known at first about the inefficiency caused in the low side by the oil. As a matter of fact, in machines of the flooded low side type using a float valve, the oil was allowed to accumulate on the surface of the liquid refrigerant and act as a blanket to retard evaporation and thereby prevent the frosting of the suction line. However, every service engineer can remember installations that would get oil bound in the evaporator and stop refrigerating because the calibration of the float valve for the oil level was slightly inaccurate. In such cases, the unit would have to be heated and "dumped" before it would operate normally and even though the float valve was replaced, the trouble might occur again in a short time.

While this difficulty may have been somewhat of a necessary evil on the low side float controlled job, most equipment now sold uses a high side float if it is of the flooded type. Nearly every commercial installation uses an expansion valve and has a dry low side or semi-flooded low side so that no benefits whatsoever are to be derived from having oil in the low side.

It is to be expected that all compressors will pump a certain amount of oil past the pistons and if this oil serves no useful purpose beyond the crankcase of the compressor, let us investigate what difficulties may be experienced from it.

First, when the oil leaves the crankcase of the compressor, the oil level in the compressor is reduced unless an excess amount is added to take care of that which is held in the condenser and traps in the system. When the oil level is reduced, there is a possibility that the compressor will receive abnormal wear and serious damage because of lack of lubrication.

Even if an installation is getting a good oil return when first installed, a small leak of refrigerant in the system might occur unnoticed and, as the liquid refrigerant is lost, oil can be trapped in its place, leaving the compressor robbed of oil. Such conditions occur frequently and cause much equipment to wear prematurely and lose its efficiency.

Let us next consider how the oil, once it is pumped by the pistons into the condenser, can get out of the condenser. Offhand, one would believe that it would flow on out through the liquid receiver valve, just as the refrigerant does. However, because the oil is lighter than the refrigerant it will float on the surface of the refrigerant, and since the liquid receiver valve always takes its supply of refrigerant from the bottom of the receiver, the oil remains trapped in the receiver. Under such conditions, the oil would never return to the crankcase were it not for the fact that the refrigerant has an affinity for oil and absorbs a

The efficiency of rebuilt refrigeration units such as the one shown here is greatly increased by the application of an oil separator (Note separator at left of the machine.)

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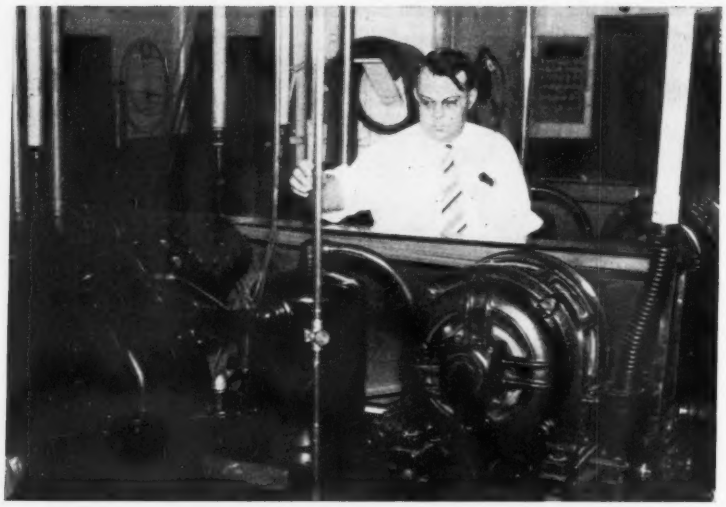

Note the large volumetric capacity of the oil separator installed on this 20-ton air conditioning compressor.

very small percentage of it which it gives up when it evaporates. By this slow method, the oil eventually gets back to the compressor.

A compressor that is pumping an excess amount of oil would soon rob itself because of no immediate oil return and, in addition to that, the oil would take up much of the condenser space, reducing the amount of effective condenser area. High head pressure would then result and the condenser in this crippled condition could not handle its rated capacity. It is needless to add that high head pressure from such conditions has been the cause of short cycling from the high pressure cut out and of the burning up of many motors. The remedy for such a condition would be to "dump" the condenser and receiver of its oil and to place a proper charge of oil in the crankcase again.

Further Advantages Found

The thoughts mentioned above are all good reasons why any refrigeration job, whether large or small, should have an oil separator installed when the installation of the equipment is made if the equipment is not already provided with a separator. However, recent engineering tests and data have brought to light information that has not been known heretofore and which offers even more convincing argument as to why an oil separator should be used in order to gain greater thermal efficiency from the cooling coils.

For example, it has been found that a cooling coil has a decided reduction in effective capacity when a large amount of oil is traveling with the refrigerant through the coil. Of course, the greater the amount of oil, the greater will be the reduction in efficiency. This reduction in efficiency of the cooling coil results from the fact that oil is a poor conductor of heat and as it flows through the tubes of the coil, it forms a film on the walls of the coil and increases the resistance to heat transmission. Under such conditions, the refrigerant will be at a much lower temperature than the coil tube surface.

It is common practice of some service engineers, after completing an air conditioning installation, to check the temperature of the coil with field gauges by means of known pressure-temperature relations for the refrigerant used. With conditions such as the above in exisence, information obtained from this type of test will be in error and the service engineer will not realize that the suction pressure must be dropped in order to obtain the rated capacity of the coil.

If checks are to be made by this method, then it would be well for the service engineer to have an analysis made to determine the amount of oil carried in the refrigerant. Such an investigation should be given consideration when a coil fails to deliver its rated capacity or temperature at a certain back pressure.

In addition to the oil in a system forming a heat resisting film on the wall of the tubing, it also increases the friction loss or pressure drop in the coil as a whole and plays havoc with the capacity of thermostatic expansion valves. With such difficulties a possibility, it would appear that the oil separator can be an important factor in efficient operation.

Perhaps it would be well to point out here most emphatically that oil should never be added to a system as a possible remedy for some unknown fault, but only when the crankcase oil level is low. Of particular importance, then, is the need of learning what has become of the oil displaced.

With these facts in mind, the reader will perhaps wonder why the manufacturers of refrigeration equipment have not already adopted oil separators as standard equipment on their units. The truth of the matter is that the real value of oil separators has just been established in the last few years. The higher initial cost of units so equipped has deterred any one manufacturer from taking the lead. With separators added, it would be necessary to increase the selling cost in the face of competition.

New Machines Have Separators

Also, oil separators have been in a stage of development and, until recently, could not be depended upon for thorough reliability and efficiency. However, the manufacturers of most all air conditioning equipment have adopted them and it is quite possible that they will be standard equipment on the smaller refrigeration units in the near future.

If all other good reasons for the use of separators were discarded, they would still be most desirable from the standpoint of better lubrication, for there is a growing demand for equipment that is quiet, compact and self contained. To accomplish this, the old slow and lumbering type of compressor will have to go and in its place will be a small, quiet, compact, high speed machine. Yet for such higher speeds, the lubrication system will necessarily have to be redesigned and in such redesign I am sure that the oil separator will have an important part to play.

Not only will the oil separator play an important part in machines of the future, but there is

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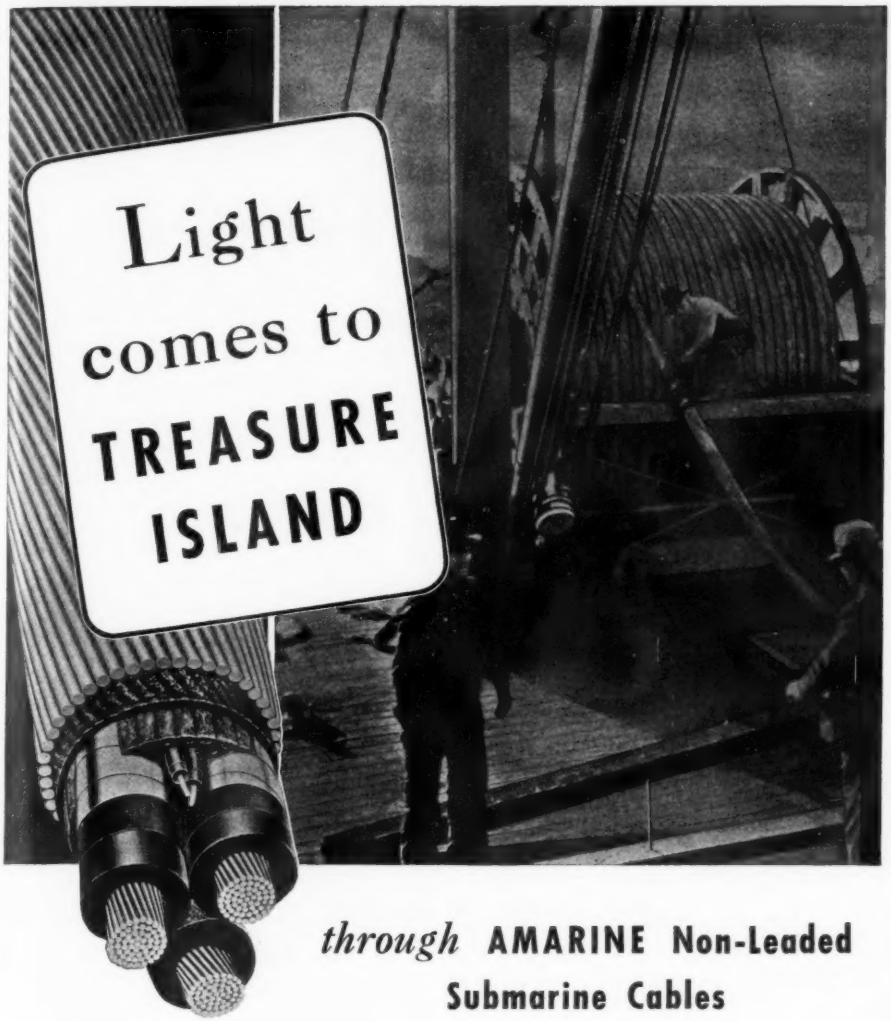

through AMARINE Non-Leaded Submarine Cables

NEW heights in the art of illumination have been attained at the Golden Gate International Exposition. First to be perceived by the visitor, and perhaps last to be forgotten, are the novel lighting effects. These are dependent upon electrical energy—energy carried to the Island by *Amarine* non-leaded submarine cables, laid beneath the waters of San Francisco bay.

Each cable is composed of three-stranded copper conductors, insulated with Amarine-40 rubber compound for service at 11,000 volts. Armored with heavily galvanized steel wires, it has an outer diameter of more than 4 inches and weighs 18 pounds per foot. Each conductor of the shore end is shielded with tinned copper tape. A thin layer of semi-conducting material, applied between rubber insulation and copper tape and in intimate contact with both, assures positive and permanent shielding.

The new cables, installed in 1938, lie not far from two other Amarine non-leaded submarine cables that were installed in the same bay 16 years ago, and which are still in good condition and giving satisfactory service.

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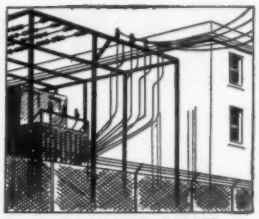
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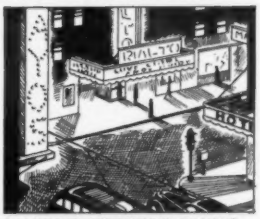
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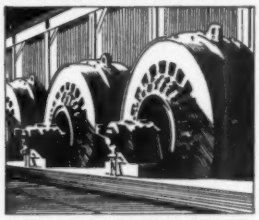
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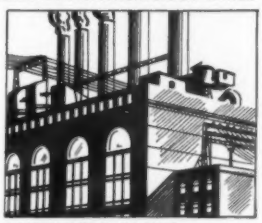
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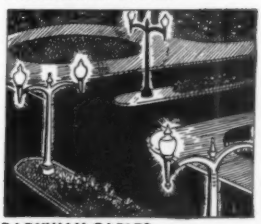
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UNITED STATES STEEL

NEWS of the INDUSTRY

Dealers

Appliance Sales Trend Upward

Marked increases are still being recorded in the sale of electrical appliances in 1939 in comparison with similar periods in 1938.

June 1939 sales of household electric refrigerators, as reported by the National Electrical Manufacturers Association on net sales to dealers and jobbers, totaled 58,837 units in the sixteen southern states comprising the South Atlantic, East South Central, and West South Central groups. These sales represented an increase of 154 per cent over the 23,127 unit sales reported for the same territory during the month of June.

Sales of household electric refrigerators in southern states during the first six months of 1939 totaled 310,277 as compared to 210,032 during the first six months in 1938, an increase of 68 per cent.

Domestic electric range sales in June 1939 in the sixteen southern states totaled 7,777 units, according to report from the National Electrical Manufacturers Association on net sales to dealers and jobbers. Domestic electric range sales in the sixteen southern states for the first six months of 1939 totaled 41,232. Comparative figures for the same period of 1938 were not available but this total compares very favorably with the approximate number of 50,000 ranges sold in the same territory in the entire year of 1938.

Household electrical vacuum cleaner sales in July were 11.7 per cent above those of the same month in 1938, totaling 76,689, compared to 68,655, according to industry figures reported today by C. G. Frantz, executive secretary of the Vacuum Cleaner Manufacturers' Association.

July was the ninth consecutive month, with one exception, to show an increase over the same period a year before.

Sales for the first seven months of this year aggregated 782,942, increase of 4.5 per cent over the total, 747,838, reported in the same period of 1938.

Factory shipments of household washers continued their advance in July, for the ninth consecutive month showing a gain over the same month in the previous year.

July shipments totaled 104,817 washers, compared to 74,019 in July, 1938, an increase of 41.6 per cent, according to industry-wide figures reported by J. R. Bohnen, executive secretary-treasurer of the American Washer and Ironer Manufacturers' Association.

Shipments for the seven months of 1939 aggregated 838,877 washers, compared to 615,917 in the same period last year, an increase of 36.2 per cent.

July ironer shipments, 7,741, represented a drop of 3.0 per cent from July, 1938, and the seven-months total, 60,268, an increase of 1.6 per cent over the same period last year.

Appliance Sales Left To Dealers in Tenn.

After a meeting with Nashville electrical appliance dealers early in August, W. C. Baird of the Nashville Power Board announced that the board will leave the entire field of appliance selling to the dealers.

"There has never been any intention of the Power Board to do anything other than helpful cooperation with the Nashville merchants," Mr. Baird said.

* * *

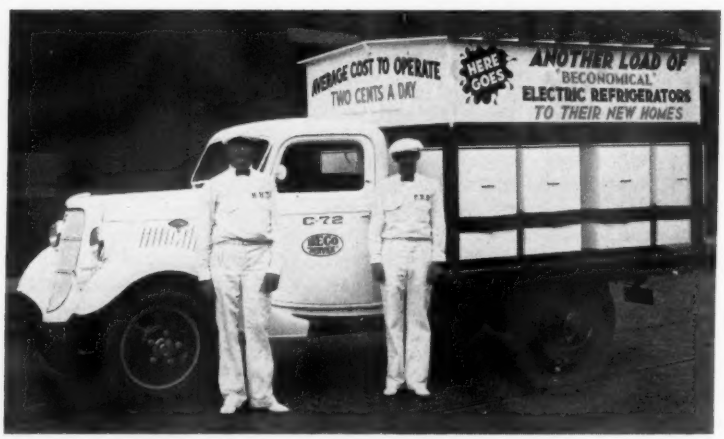
The Memphis Light, Gas and Water Division has agreed not to handle electric appliances in competition with private electrical appliance dealers. The stock of appliances taken over through the purchase of the Memphis Power and Light Company is now being disposed of at retail but will not be replaced, it was indicated.

* * *

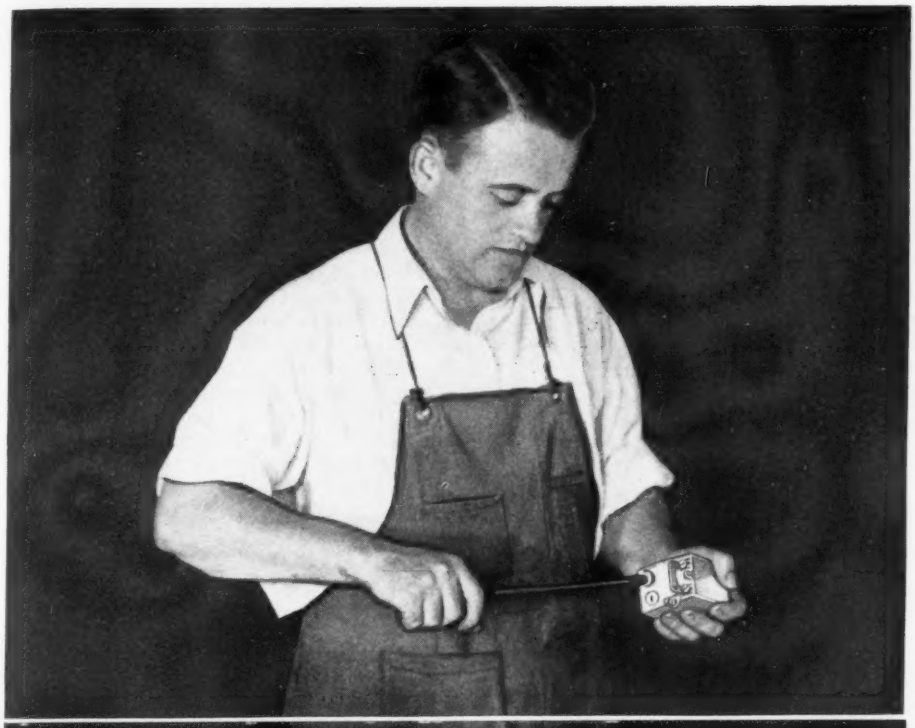
Max Bartlett, manager of the Knoxville Electrical Department, said recently "We sell no appliances but we do cooperate with private dealers in boosting their sales. The private utility disposed of all its stock before the city purchased it and the city does not plan to enter this field."

* * *

Chairman L. J. Wilhoite, of the Chattanooga Power Board, said recently that his unit did not plan to enter in the field of merchandising of electrical appliances and equipment. "We will leave that business open to the electrical merchants," he said. "We will retain trained technicians, however,



Electrical refrigerators are advertised as they are delivered in this new truck utilized by the Birmingham Electric Company. The truck carries eight refrigerators in full view but in case of rain heavy shades can be let down all around. In order to live up to its "advertising copy," the truck carries eight refrigerators on every load whether all eight are actually being delivered or not. However, recent business has been such that it has not been difficult to keep the truck fully loaded.



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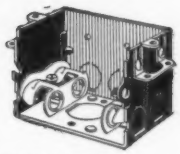
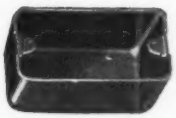
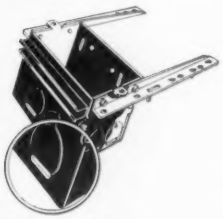
HERE ARE A FEW OF THE PRODUCTS IN THE COMPLETE RACO • ALL-STEEL • PRODUCTS LINE



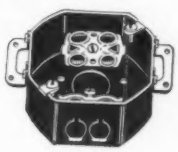
RACO●ALL-STEEL SWITCH BOXES. The MC, used in old or new work. The Switch Box you need is in the Raco●All-Steel Line.



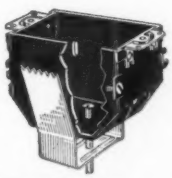
RACO●ALL-STEEL UTILITY or HANDY BOXES for surface wiring—old or new work.



RACO●ALL-STEEL "PRI-OUTS" for Clamp Boxes, in both the Switch Box and Outlet Box lines.



RACO●ALL-STEEL EXTERNAL MOUNTING EARS for Outlet Boxes. Any type of Raco●All-Steel Octagon Box will be furnished with External Mounting Ears on special order.



RACO●ALL-STEEL OLD WORK SWITCH BOX for mounting in a rewiring or modernization job.

RACO●ALL-STEEL "HI-LO" BARRIERS for the separation of differing voltages.

necessary to promote wider use of electrical equipment."

* * *

All electrical dealers of Columbia, Tennessee, and vicinity, assembled in the Chamber of Commerce offices August 12 on the call of R. W. Williamson, manager of the Columbia Power System. Mr. Williamson announced that the city system will not sell electrical merchandise of any kind but will make every effort to assist all dealers and contractors and in return is asking them to conduct their business on the highest ethical plane.

National Contest for Counter Cooking Salesmen

Five awards, totalling $200 in cash prizes, are offered by the Commercial Electric Cooking Council, 420 Lexington Ave., N. Y., for papers by salesmen on "How I Sell Electric Counter Cooking." Any dealer or utility salesman in the United States selling electric counter cooking appliances is eligible to compete.

The contest is designed to bring out from men in the field their experiences and successful methods of selling electric counter cooking equipment. The papers will be used for publicity and advertising purposes in order to give all salesmen the benefit of these experiences and for the general promotion of commercial electric cooking. First prize will be $100, 2nd prize, $50, 3rd prize, $25, 4th prize, $15, and 5th prize, $10. In case of a tie, duplicate prizes will be awarded.

Entries will be received from September 5 to October 31, inclusive. Papers are limited to 1,500 words or less. Awards will be determined on sales ideas and methods which have proven successful and which the contestant believes will help other salesmen in their work (50 per cent); clarity of expression (20 per cent); originality (20 per cent); and neatness (10 per cent). Papers may be illustrated with photographs, but these are not essential.

New Sales Manager Appointed

Martin Wright Electric Company of San Antonio, Texas, has announced the appointment of O. W. Willey as sales manager in charge of appliance sales. Mr. Willey has been associated with such sales for a number of years and will bring this experience to his new connection.

New Firms, New Stores And New Lines—

Announcement of the sale of the interests of the Bocock-Stroud Company in the local sporting goods and General Electric appliance store located at 224 North Elm Street, Greensboro, N. C., to C. O. Eatman and Rufus Smith was made early in August.

The firm already has begun operations under the new management and will assume the name of Eatman-Smith, Inc. Under the new setup, Mr. Smith who has been connected with the company for several years, will become president and will act as traveling representative of the company. Mr. Eatman assumed active management of the store as secretary-treasurer of the firm.

The same staff of clerks will be retained and the store will be operated as previously, Mr. Eatman stated, with the exception of C. V. Connelly, former manager, who has returned to the Winston-Salem office of the Bocock-Stroud Company. Mr. Connelly served here as manager during the two years the firm operated here.

* * *

Opening of the Lebanon Refrigeration and Radio Service Company at 109 South College Street, Lebanon, Tenn., was announced recently by Bill Branstetter who will manage the establishment. The shop will offer prompt and efficient repair service on all types of radios and electrical refrigeration.

* * *

The General Appliances Store, on Gilmer Street, Reidsville, N. C., is now under the management of Thornton B. Stone, who arrived here recently from Los Angeles, Calif. The General Appliance Store was established in Reidsville in April when J. F. Finney first opened it. Mr. Finney has moved to Richmond, Va.

* * *

The Lemmond Electric Company, of Monroe, N. C., dealers in General Electric home appliances have moved to a modern new home at Main and Windsor Streets. The firm has been in business approximately one year. During this time it has greatly increased its volume according to M. L. Lemmond, president and general manager.

* * *

R. S. Jordon, electrical appliance dealer of Elizabeth City, N. C., will move into new headquarters on Church Street about August 1 as soon as extensive repairs and remodeling now under way are completed.

* * *

With business improving continually, Frank Kirby of the Anniston Electric Company, Anniston, Ala., has opened a branch in Jacksonville, Ala. Almost the whole town was on hand for his opening party.

Contractors

Contractors Association Organized in Dallas

Fourteen Dallas electrical contractors organized recently to form a chapter of the National Electrical Contractors' Association. Officers of the chapter include A. R. Abright, Abright Electric Company, president; Roscoe Libecap, Libecap Electric Company, vice-president; and Eddie Telkamp, Telkamp Electric Co., secretary.

The Chapter will hold weekly meetings on Thursday evening which will consist of round table discussions on various problems confronting the local industry.

Approximately thirty to thirty-five electrical contractors in Dallas are members of another association known as the Associated Electrical Contractors of Dallas, which is a local organization and is not affiliated with the national association.

Six Montgomery Contractors Organize NECA Chapter

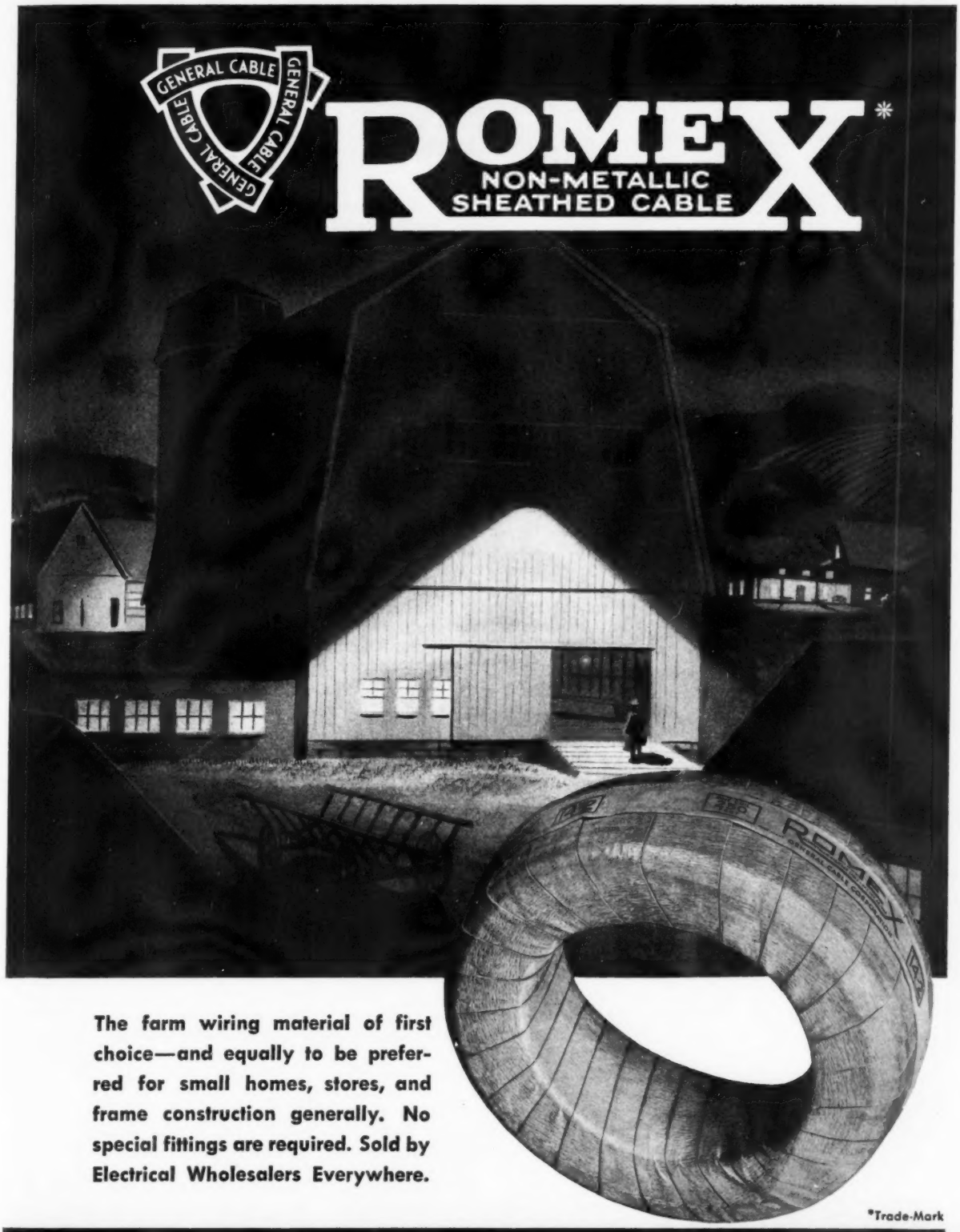
Six electrical contractors of Montgomery, Alabama, organized recently to form the Montgomery Chapter of the National Electrical Contractors Association, charter in which organization was granted to the group shortly after its application. George M. Stowers, of the Montgomery Electric Company, acted as president pro tem during the preliminary meetings and charter preparation and, upon the official formation of the chapter, was elected president. F. M. Mosley, of the Mosley Electric Company became vice president, and J. N. Crump, of the Dixie Electric Company was named secretary and treasurer. Other members are G. T. Key, G. T. Key Company; T. D. Little, T. D. Little Company; and Frank Powell, Powell Electric Company.

The contractors of Montgomery had felt for some time the desirability of affiliating with the national association, but action had been held up due to the relative smallness of the potential membership. Finding this no barrier from the standpoint of the

GENERAL CABLE GENERAL CABLE

ROMEX*

NON-METALLIC SHEATHED CABLE



The farm wiring material of first choice—and equally to be preferred for small homes, stores, and frame construction generally. No special fittings are required. Sold by Electrical Wholesalers Everywhere.

*Trade-Mark

GENERAL CABLE

General Cable Corporation Sales Offices: ATLANTA • BOSTON • BUFFALO • CHICAGO • CINCINNATI • CLEVELAND • DALLAS • DETROIT KANSAS CITY (MO.) • LOS ANGELES • NEW YORK • PHILADELPHIA • PITTSBURGH • ROME (N. Y.) • ST. LOUIS • SAN FRANCISCO • SEATTLE • WASHINGTON (D. C.)

N.E.C.A., however, the group proceeded with the preliminary work in June. Efforts at standardizing on a higher standard of wiring requirements, in all work, whether residential, industrial or governmental, will occupy the attention of the newly formed group, whose influence will extend to several small towns adjoining Montgomery, since its members do the majority of the work in them as well as in their own city.

City Ruling Affects Examining Board

Because of a recent ruling that no person holding a municipal office may do business with the city, two members have resigned from Richmond's electrical examining board, and utilities director J. R. A. Hobson, Jr., is having difficulty filling the vacancies on the board.

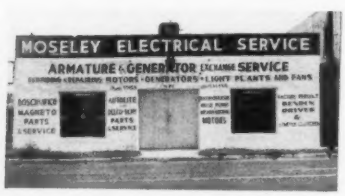
Morris Hunter, electrical contractor, and Fred A. Waldbauer, who represented the Electrical Workers Union, are the two members that resigned.

The vacancy of the electrical contractor member was solved through the assistance of the Richmond Association of Electrical Contractors which agreed that one of its members would serve for one year only, during which period he would refrain from bidding on any city jobs. Eugene F. Griffith, manager of the Union Electric Company, was nominated to serve on the board for the current year.

Miami Motor Firm Takes New Quarters

Consistently good workmanship and year 'round attention to the needs of "home folks" have made it necessary for Earl A. Moseley, proprietor of Moseley's Electrical Service, Miami, Fla., to move his motor and generator repair business to larger quarters. The new shop is located at 571 N. W. 5th St.

"In a seasonal city," says Mr.



Moseley, "there is always a great temptation to skim the cream off the 'tourist trade' but to us it has seemed better policy to cater to local people on an all-year basis. We can't be too far wrong in our judgment because we certainly did outgrow our previous location."

Purchased last May, the concrete block structure, which Mr. Moseley now occupies, has a frontage of 50 feet on N. W. St. (a crosstown traffic artery) and extends back an equal distance along 6th Ave. on a lot 100 feet deep. The setup provides for considerable expansion of present plant facilities by an addition to the rear of the building and a second story if necessary.

Situated only one block away from one of the city's most important longitudinal thoroughfares at a point where it crosses the Miami River, Moseley Electrical Service has an excellent location in the heart of the appliance, marine and automotive repair shop district, and it is from these shops that Mr. Moseley draws the bulk of his business.

Large Building Projects Begun

Construction contract awards for two large slum-clearance and low-rent housing programs in the South were approved recently by the Administrator of the United States Housing Authority.

One of these projects, which will be known as "Clark Howell Homes," will include 630 dwelling units and will be built in Atlanta, Georgia, on a site about one mile north of the heart of the city just south of Georgia Tech University and adjacent to the "Techwood Homes" another public housing project built by the Public Works Administration. The general construction contract was awarded to Mion Construction Company of Atlanta and amounts to $2,227,752.

The second project will be constructed in Birmingham, Alabama, and will be known as "Eleyton Village." This project will provide homes for 860 families. The general construction contract, amounting to $2,911,000, was awarded to J. A. Jones Construction Company, Charlotte, N. C.

Wholesalers

Changes Announced in Graybar Organization

The Graybar Electric Company has announced several changes in its general sales department. The new organization of the department is as follows:

E. A. Hawkins, general sales manager; G. F. Hessler, assistant general sales manager; D. C. Guest, sales manager outside construction department; L. W. Taylor, assistant sales manager outside construction department, Chicago; J. A. Mayer, supply sales manager.

D. H. O'Brien, general merchandising manager; R. C. Litchfield, assistant general merchandising manager; G. A. Antrim, assistant general merchandising manager.

G. K. Heyer, general telephone and power apparatus sales manager; A. J. Eaves, research products sales manager; L. D. Gore, sales manager hearing aids department; G. L. Donnett, research products sales engineer; E. J. Dailey, power apparatus sales manager; C. S. Powell, telephone sales manager; J. B. Long, telephone sales engineer, A. E. Hetzner, signalling sales manager.

H. Metz, general lamp and lighting sales manager; R. C. Kinney, lighting sales manager; K. B. Hopkins, advertising manager; Mildred A. Nichols, director of the home economics department; J. H. Gardiner, sales statistician; and W. R. Wheeler, traffic manager.

Change in Ownership for Norge Distributor

Announcement was made recently of the sale of the Ellis Chaney Company, San Antonio (Texas) Norge distributorship, to W. C. Rowles, who was formerly connected with the Norge division of the Borg-Warner Corporation. The new firm will be known as the Norge Southwest Sales Company and will control distribution of

Norge products in 49 counties in southwest Texas.

Mr. Rowles formerly was district manager for Norge and visited San Antonio and other southwest Texas cities in that capacity. He has been associated with the manufacturing, production and sales phases of the refrigeration business since 1918. Until recently, he was regional manager for Norge in the mid-west.

Ellis Chaney stated that he was not retiring from active business and that his plans for the future were not definite. He will retain his interest in Southland Industries, Inc., operators of radio station *WOAI*, of which he is vice-president and a director.

Arkansas Utility Executives Entertain Appliance Distributors

Electrical appliance distributors and sales representatives operating in Arkansas were the guests of Harvey Couch, president; Frank M. Wilkes, general manager, and P. C. Tucker, general sales manager of the Arkansas Power & Light Company at an informal get-together at Couchwood, country estate of Mr. Couch, on August 4th and 5th.

Visiting executives began arriving about noon Friday and continued to register until late in the afternoon when supper was served. This was followed by a round-table discussion of topics of interest to the appliance dealers. Special attention was called to the sales possibilities afforded by the new residential rate which will go into effect on September first and which will give customers approximately 9,500,000 kilowatt-hours at no additional cost.

No program was scheduled for Saturday morning. Breakfast was served in the main dining room of the lodge and guests entertained themselves by fishing, swimming, horseback riding, motor boating or engaging in numerous other out-of-door activities.

Sales representatives for the various distributing concerns represented arrived for a meeting at 2:00 o'clock Saturday afternoon at which Charles T. Evans and J. F. Tuohey outlined the company's advertising and sales promotion program. Mr. Couch spoke briefly and invited the guests to remain at Couchwood over the week-end. This meeting was followed by a barbecue dinner.

PUT MORE MEN BACK TO WORK!
Shove aside the old ideas about wiring!
There is profit in the wiring business—
but it takes new ideas
PUT MORE MEN BACK TO WORK!
Rewiring with profit. The easiest, quickest, most profitable way to rewire is with "Plug-In" Strip.
Take off baseboard trim, shove in "Plug-In" Strip and replace trim.
No muss - plaster - painting - no fuss.
Give them what they are asking for - more outlets - more places to plug-in.
No other method of rewiring effectively and economically fulfills the customer's wants.
Put more men back to work. Write today for the handbook "The New Method of Circuit Wiring."
1 Remove molding from baseboard.
2 Fasten "Plug-In" Strip on top of baseboard.
3 Nail Molding back in place.
"Plug-In" Strip is easily installed. Mounting clips and joiner-links are supplied with each length.
National Electric Products Corp.
Pittsburgh, Pa.
NATIONAL
ELECTRIC PRODUCTS
NE
WIRING SYSTEMS
WIRES AND CABLES

Utilities

Government Ownership Complete in Tennessee

". . . and so private ownership and initiative withdrew in favor of the Government. The company —pioneer citizen and tax payer— which for more than half a century served the people of the State of Tennessee was liquidated."

With these words dramatized in an advertisement appearing in local newspapers, the Tennessee Electric Power Company wrote "finis" to its operations in Tennessee.

On August 15, Commonwealth and Southern Corporation delivered to the Tennessee Valley Authority and thirty-four municipalities and cooperatives the physical properties and deeds of the Tennessee Electric Power Company for a consideration of $78,600,000.

Nearly 250 representatives of Commonwealth and Southern Corporation, TVA and other participating agencies and municipalities gathered in the offices of the First National Bank Building, New York, to witness the deal, one of the largest of its kind on record.

In completing the transfer of the properties, Wendell L. Willkie, president of Commonwealth and Southern, asked the government to heed two principles which he termed essential if the system of free economic enterprise in America is to be preserved.

"I ask first, as I have asked many times before, that the government discontinue its competition with private business outside the Tennessee Valley," Mr. Willkie said. "It now has its yardstick area. It should be content with that, so that in the other areas of this nation the utility industry may make its vital contribution to American business recovery.

"Second, I ask that these government agencies should keep their books on a completely honest basis so as not to mislead the American people, from whom these commissions get their power. Not only should these agencies observe the rules laid down by the government for the utilities themselves, but they should make due allowance for such things as the tax income loss to the federal and local government whenever a private enterprise is destroyed.

"Subsidized government competition not only wipes out tax revenues but destroys that confidence in private enterprise which is essential to economic recovery."

Shortly after the transfer of the C & S properties in Tennessee, it was announced by John E. Blandford, general manager of TVA, that a contract for the sale of power had been signed by the TVA and the Commonwealth and Southern Corporation for distribution by the Alabama Power Company.

The agreement calls for the sale of about 440,000,000 kilowatt hours of electricity annually to the Alabama Power Company and means about $100,000 a month revenue for TVA. The agreement is for ten years and may be terminated by either party on eighteen months' notice.

Alabama Law Prevents Plant Duplication

The Booth bill to prevent duplication of electric power facilities in Alabama became a law August 20 after being passed by both houses of the Alabama Legislature with very little opposition and being signed by Governor Dixon. The legislators paid no attention to a telegram to the governor from John M. Carmody, Federal Works Administrator, who said the bill would "once and for all time scuttle the hopes of Alabama municipalities" to own and operate electric systems. Chairman H. A. Morgan, of TVA, also termed the bill "of doubtful merit."

The legislation was proposed by President Thomas W. Martin, of the Alabama Power Company, who said his company and its stockholders needed this protection before embarking upon a $100,000,000 expansion program, which will include a $5,000,00 steam generating plant near Mobile.

On learning of the enactment of the Booth bill, President Martin issued the following statement:

"The Booth bill has now been passed by both legislative branches in Alabama with but two votes against it in each house. It will go a long way towards stabilizing the power situation in Alabama. It is intended by the legislature to offer assurance to investors and to prospective investors that their funds will be safe if invested in Alabama.

"Additional power facilities are necessary to meet rapidly developing demands for power in Alabama and we are making plans to begin an expansion program. These plans are now possible only because of the action of the legislature. Our program, financed by private capital and without government subsidy, should put idle

First men in the Southwest to complete the Hotpoint "HQ" correspondence study course on five of the major kitchen appliances: ranges, refrigerators, home laundry equipment, water heaters, and kitchen sanitation equipment, were Al Sullivan and D. T. Elmore, both salesmen for Texas Power & Light Company. W. A. Grove, advertising and sales promotion manager for Edison General Electric Appliance Company, Inc., Chicago, is shown here presenting the certificates. From left to right are Mr. Sullivan, G. B. Richardson, vice-president, Texas Power & Light Company, Mr. Elmore, and Mr. Grove.

men and idle money back to work. Our program will mean orders for manufacturers of equipment, as well as for coal producers and railroads, and work for the employes of those industries."

The Booth bill. modeled somewhat after the Wisconsin and Massachusetts laws, provides that a city wanting to engage in the power business must offer to buy the existing facilities. If an agreement can not be reached on the price, the matter is then taken to the Public Service Commission to fix a figure. If this is not satisfactory to both the city and the power company, an appeal would go to the Circuit Court. Then if the power company does not accept the court's figure, the city could duplicate the facilities; but if the city does not accept, the power company can continue to operate and the city can not duplicate.

The law does not apply to municipal systems now under construction including those at Bessemer and Tarrant, near Birmingham. Several Alabama cities and towns have duplicated private lines without making any provision for the purchase of same. The Booth bill means that any city wishing to go into the power business in the future must pay a fair price for the properties which it takes over.

Personnel Announced For Chattanooga System

The key personnel of the Chattanooga Electric Power Board, consisting of some sixteen department heads who will operate the system under General Superintendent S. R. Finley, was announced early in August. Nine were employed by the Tennessee Electric Power Company.

After a conference of these men with the power board in its offices it was announced also that the city will take over about 300 Tennessee Electric Power Company employees while the TVA will employ about 600 of them.

N. J. Simmons, secretary of the power board, will be the chief accounting officer. Associated with him will be C. Wright, assistant secretary and treasurer of the power company, who will be in charge of general accounting.

Ed Cullis, in charge of customer accounting, credits and collections

for a DEPENDABLE JOB INSULATE ALL CONDUCTORS
...with PORCELAIN NON-METALLIC WIRING ACCESSORIES by KNOX
UL
LISTED UNDER RE-EXAMINATION SERVICE
UNDERWRITERS' LABORATORIES, INC.
FOR PERMANANCE, SAFETY AND ECONOMY SPECIFY AND USE THE COMPLETELY INSULATED SYSTEM. IT IS NOW AVAILABLE TO THOSE WHO VALUE LIFE AND PROPERTY.
★ CATALOG AND SAMPLES ON REQUEST
NO SHORTS · NO GROUNDS · NO CORROSION · NO ABSORPTION
A NEW DAY IN HOUSE WIRING
KNOX PORCELAIN CORPORATION
KNOXVILLE, TENN.

with the power company, will take over the same work in the city system, and Ken Whitaker, who has been with the power company about a year in the capacity of PWA contact man, will be in charge of purchasing and stores.

The four principal engineers will include one TEPCO man, George F. Parker, who has been employed as a transmission engineer. Frank Lloyd will remain with the city system as overhead lines engineer, as will Ed Parker, underground engineer. John Milburn, also, will continue in the city's employ on underground engineering work.

C. B. Osborne, the power board's sales promotion engineer, will continue in this capacity, as will Charlie Simpson, who will handle budget statistics.

H. G. Williams, who came to Chattanooga from the TVA in Mississippi about six months ago to head the distribution department for the city system and who has charge of all operation and maintenance work, will continue in this capacity.

F. J. Henley, formerly assistant superintendent in the TEPCO line department, will be superintendent of the line department of the power board and E. C. Williamson will be superintendent of substations and underground lines. Williamson was employed as superintendent of substations for TEPCO.

E. E. Doudna, the power board's superintendent of meters and relays will continue in this capacity, and P. Varner, superintendent of TEPCO appliance repair department, will continue in this same job after the transfer.

E. R. Kelly, superintendent of the construction department for the power company, will be in charge of substation maintenance for the city system, while W. E. Dent will be superintendent of system operation, in charge of all substation operations, such as dispatching and trouble-shooting. He was assistant superintendent in TEPCO transmission department.

New President for Oklahoma Utility

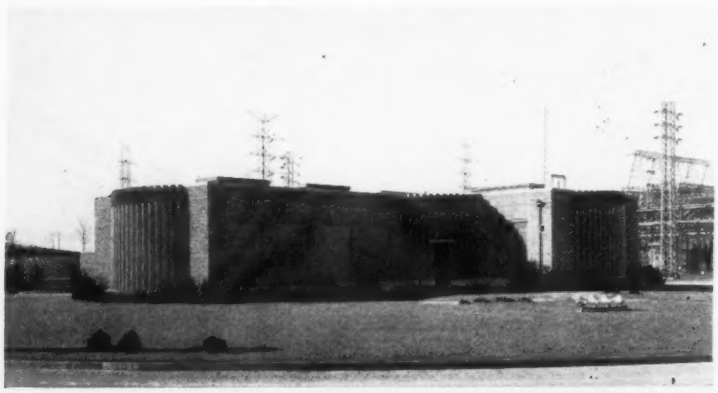
J. C. Happenny has been elected president of the Oklahoma Power and Water Company, at Sand Springs, to succeed R. W. McClure who recently announced his resignation.

Mr. McClure will assume the duties as president of the Kansas Electric Power Company in Lawrence, Kansas.

Mr. Happenny has been associated with public utilities since 1929. He was formerly treasurer of the Central Illinois Public Service Company, of Springfield, Ill., and before that was associated with the Central and Southwestern Utilities Company at Dallas, Texas.

Memphis Retains Employees

After nearly a month of operating the electrical and gas distribution business purchased from Memphis Power and Light Company, city officials have reached the conclusion that the full staff of both the city system and the company system can be retained by the Memphis Light, Gas and Water Division.



A new note in the beauty of functional design is struck by this recently completed sub-station of the Memphis Light and Water Division. Especially interesting is the application of Insulux glass block in the two large bays, and the spacious panels of Insulux in the side walls.

Florida Utility Completes Summer Campaign

Attaining approximately 90 per cent of the sales quota set for their major appliance summer campaign, the Florida Power Company, St. Petersburg, brought the campaign to a close in August with 971 electrical ranges and water heaters added to the distribution lines. The contest was called the "Higgins Yacht Regatta" in honor of the company's president and the sales race was placed in charge of R. H. Geidd, new business manager.

A leading objective of the summer promotion was dealer cooperation and although sales results were ten per cent short of the quota, they were particularly gratifying in view of the favorable response from cooperating dealers in this first combined effort on major appliances.

The Western Division sold the greatest percentage of its quota, although the high man in the two upstate divisions was Hugh Blair of Wildwood. Jerry Watson and Jerome Thompson of the Western Division ended with second and third honors respectively. Allen Kessler took top honors in the Southern Division.

Kessler Electric Company and Hibbs Electric Company, both of St. Petersburg, were winners respectively of the company's first and second prizes for cooperating dealers.

Opens New Branch Office

The Florida Power Corporation opened a branch office August 1st in the Gulf Beach News Building at St. Petersburg Beach, for the accommodation of residence and vacation users at the Gulf Beaches, a few miles from St. Petersburg. Jack Ginty is district representative of the utility in charge of the new office.

Promotion for Texas Man

R. D. Smith, Jr., formerly manager of the Marfa, Texas, district of the Central Power and Light Company, was recently promoted to the position of merchandise sales supervisor for the company and will make his headquarters in Corpus Christi.

Mr. Smith's district was winner in a company wide sales cam-

paign conducted recently. Employees in his district achieved 438 per cent of the quota assigned to them.

Associations

First Fall Meeting Of ASHVE in Atlanta

Announcement has just been made of the inaugural fall meeting of the American Society of Heating and Ventilating Engineers to be held in Atlanta, Ga., on October 30 and 31, 1939, with the Atlanta Chapter of the Society as hosts. It is planned to have three technical sessions, a get-together luncheon, a banquet and dance, and a program of special entertainment for ladies.

Since the Semi-Annual Meeting of the Society in July, when the Council accepted the cordial invitation of the Atlanta Chapter members to be hosts for the Fall Meeting, a general committee on arrangements has been appointed consisting of L. F. Kent, general chairman; C. T. Baker, vice-chairman; C. L. Templin, reception; S. W. Boyd, registration and sessions: E. W. Klein banquet; T. T. Tucker, ladies; A. H. Koch, sports; G. H. Brodnax, Jr., transportation; M. M. Crout, publicity; and C. B. Cole, finance.

The Council will meet at the Atlanta Biltmore Hotel on October 29 preceding the general Society meeting.

Atlanta Chapter members are enthusiastic about the prospect of entertaining the Society and, as this was the first Chapter organized in the South, its members keenly appreciate the responsibility of acting as hosts for the first fall meeting.

Adequate Wiring Activity Initiated in San Antonio

A thoroughly representative electrical industry group has been organized in the Adequate Wiring Bureau of San Antonio, Tex., to operate a wiring certification program under the national activity.

The local organization was effected at an industry meeting held recently, following which a request was made to the National

EVERY NEW HOME DESERVES-

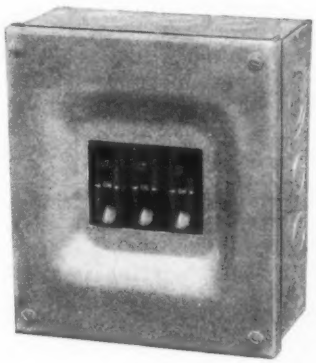
THIS

The "Magnette"

fool-proof PROTECTION

Panel Board Circuit Breaker
(Fully Magnetic, Non-Thermal)

Every modern home owner merits the reassuring protection the new "MAGNETTE" Circuit Breaker offers in the form of insurance against electrical hazards . . . no more danger from "penny-plugging" or "fuse-cutting" . . . a flip of the switch and service is restored with safety, provided circuit load has returned to normal!



THE FEATURES:

* Lasting service with no maintenance expense.
* Simple re-closing . . . no resetting, no replacements.
* Safety . . . breaker cannot be held closed against existing overload or short circuit.
* Negligible wattage loss since nothing heats.
* Cadmium - plated, corrosion - proof parts.
* Boxes of code guage steel, with baked-on aluminum finish.
* Ample KO's and wiring space.

Illustrated: Cat. No. B01S, 3-circuit surface type panel. Complete line of panel board breakers available, in 2, 3, 4, 6, 8, 10 or 12-circuit combinations without door, and with door in combinations up to 40 circuits.

WECO ATLANTA

Write for Catalog 16

WALKER
ELECTRICAL COMPANY
ATLANTA, GEORGIA

Bureau for a license to certify residential wiring installations in the city of San Antonio and within a radius of eleven miles.

The officers and Certification Committee of the Adequate Wiring Bureau of San Antonio are: R. E. Sivley, manager, Commercial Department, San Antonio Public Service Company, chairman; Edward A. Gauthier, sales promotion division, Commercial Department, San Antonio Public Service Company, secretary.

The three committee members are: J. E. Lowrey, branch manager, Graybar Electric Company; Bryan Wright, executive secretary, Society of Electrical Contractors of San Antonio; W. B. Stewart, chief electrical inspector, San Antonio.

All five branches of the electrical industry in San Antonio are represented in the Bureau.

A comprehensive adequate wiring program Plan Book has been issued outlining the 1939 activity.

In order to support and reinforce the local promotion, the San Antonio Public Service Company will engage in an active advertising and promotional campaign especially designed to draw public attention to the advantages and desirability of adequately wired homes. The intent and purpose of this advertising and promotional campaign, as is stated in the Plan Book, is to *support* and *reinforce* contractor-dealer activity and is not designed to do the whole job.

Louisiana Inspectors Discuss Code Changes

A combined meeting of both the North Louisiana Division and the Louisiana Chapter of the International Association of Electrical Inspectors was held at the city hall in Baton Rouge, August 19. The principal topics for discussion at the meeting were the code changes proposed by the Edison Electric Institute. Several members presented papers for and against the proposals. The meeting presented a last opportunity to discuss the code changes before the general meeting of the Southern Section in Asheville, September 18 to 20.

J. E. Snakenberg is chairman of the Louisiana Chapter and B. Z. Segall, is secretary-treasurer. Offices of the North Louisiana Division include E. C. Coleman, chairman, and Chas. Varnell, secretary-treasurer.

MANUFACTURERS' News

Kelvinator Salesmen Complete Training

Eight hundred and thirty-four members of the Kelvinator selling organization, located in all parts of the United States, are receiving their diplomas as members of the first graduating class of the Kelvinator National Salesmen's Institute, which was launched late last fall by George W. Mason, president of Nash-Kelvinator Corporation.

The majority of the members of the class is being graduated "with honors," according to Sidney Edlund, noted sales training counsellor, retained to head the Institute, who emphasized that the courses the group has taken are "no snaps."

"Members of our first graduating class," declared Mr. Edlund, "received passing grades on a minimum of seven salesmanship textbooks, plus one book on a modern electrical appliance. In order to receive a passing grade on a subject, a student had to qualify in an examination—and in order to pass one of our examinations, it was necessary for him to acquire his information, or knowledge, through systematic hard study."

In New Orleans, this week, W. E. Saylor, Kelvinator's sales promotion manager, will award diplomas to a large group of new graduates of the Institute.

Several large classes of students, salesmen for the Duke Power Company, with general offices at Charlotte, N. C., will shortly receive their diplomas at special ceremonies, according to reports reaching Institute headquarters at Detroit. Roy A. Palmer, assistant merchandising manager of Duke Power, recently advised the Institute that 100 per cent of the company's sales force was enrolled in the Institute—and that Institute meetings are attended by the entire group of 115 salesmen.

New Kitchen Planning Manual Available

A new Kitchen Planning Manual, addressed especially to the trade, has just been published by Westinghouse. This manual is a practical book of kitchen-planning fundamentals and standard kitchen plans for architects, kitchen engineers, builders, and retailers of complete electric kitchens.

Fully illustrated, the new manual is divided into three parts,—(1) Fundamentals of Kitchen Planning, (2) Individual Centers and Standard Kitchen Plans, and (3) Installation Data. The formula for estimating cabinet storage space, special data,

W. A. Grove, manager advertising department, Edison General Electric Appliance Co., Chicago, presented plans for the Hotpoint "Cash In" campaign to the Dallas district organization and distributor principals at a meeting in Dallas recently. On the front row, reading left to right are: Ted Morley, Dallas organization; Clyde Fant, manager appliance department, Interstate Electric Company, Shreveport; Mr. Grove; Miss Bonnie C. Duke, home economist, Dallas organization; J. T. Nee, district sales manager, Dallas; G. T. Bryant, merchandising manager, Gulf Division, Graybar Electric Company, Houston; J. F. McDaniel, Dallas organization. On the back row, from left to right; A. B. Simmons, Dallas organization; J. C. Moody, Dallas organization; M. A. Buehler, southwestern district manager, Graybar Electric Company, Dallas; Jack Moore, Dallas organization; L. B. Merchant, manager, merchandising department.

and charts for color schemes, a discussion of types of kitchens, and information on lighting the kitchen are all a part of the fundamentals of kitchen planning.

Basic charts on individual centers and standard kitchen plans and material are of special interest to architects and builders. New technical information is given on the method of estimating and installing cabinets and counters.

Much of the material in the Manual is the result of special studies and experience gained from thousands of applications by the Westinghouse Home Planning Department at Mansfield, Ohio. The book has been so edited that retailers can actually install kitchens and cabinets by using the information made available for the first time in a complete text.

The Kitchen Planning Manual can be secured from Westinghouse Electric and Manufacturing Company, Mansfield, Ohio.

Wiremold Announces Lighting Division

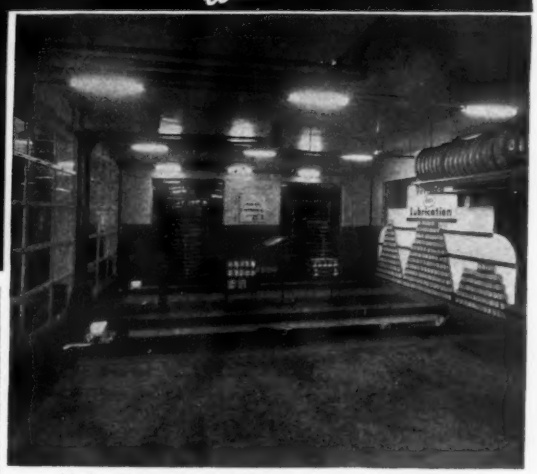
Announcement is made by D. Hayes Murphy, president of The Wiremold Company, Hartford, Connecticut, of the organization of a lighting division with Perry S. Strang as manager.

Perry S. Strang

In this expansion, the Wiremold Company follows a logical and progressive development of its services growing out of the constantly increasing use of Wiremold wiring systems for lighting development of Wiremold fluorescent lighting equipment and Wiremold showcase lighting equipment for use with either fluorescent or Lumiline lamps. Lighting equipment within the scope of the company's established products will be developed in continued close cooperation with related branches of the electrical industry.

Perry S. Strang, formerly of Chicago and more recently of Allentown, Pennsylvania, is well known in the lighting industry, his background of twenty-five years giving him a wide experience in this field. Mr. Strang has taken up his residence in Hartford, where he will carry on his new duties at Wiremold headquarters.

Reach out for NEW business with Wiremold



Modern Service Station Lighting with Wiremold Fluorescent

NEW business opportunities like these . . .

Rewiring
School Buildings
Office Buildings
Stores
Show Windows
Counters
Wall Cases
Hotels
Clubs
Restaurants
Factory Buildings
Homes
Prefabricated Houses

Outlet Systems
Beauty Parlors
Floor Lamp Displays
Table Lamp Displays
Portable Fans
Water Coolers

Overfloor Outlets
Telephone
Office Machines

Fluorescent Lamp Lighting
Bank Teller's Cage
Wall Cases
Inspection Tables
Assembly Benches
Color Matching
Etc., etc.

Become Lighting
HEADQUARTERS
for Your Territory . . .

at a time when better lighting is your best business building opportunity

OUTSTANDING Wiremold developments in the field of lighting offer Wiremold Contractors an exceptional opportunity to assume leadership in the very definite UPSWING in lighting business now evident throughout the country.

Wiremold has consistently led in the development of needed NEW Better Wiring Systems and equipment . . . to meet the demands of this trend.

Wiremold Fluorescent Strip, Fittings and Reflectors have already established new standards of convenience and efficiency in installing Fluorescent lighting.

NEW Wiremold Showcase Strip for Fluorescent and Lumiline lamps; Wiremold Show Window Lighting Systems and the broadened application of other Wiremold Wiring Systems such as "Pancake" and Plugmold in connection with lighting modernization for homes, stores, offices, commercial buildings and schools . . . all of these give Wiremold Contractors and utility lighting departments an unrivaled set-up for correct solution of present day better lighting problems.

Use Wiremold Engineering and Data Sheet Service Freely

All the resources of the Wiremold Company, including experienced lighting engineering assistance, are placed at your disposal to aid you in building profitable new lighting business NOW. Use these services freely.

O. T. JENKINS, Sante Fe Bldg., Dallas, Texas
H. C. BIGLIN, 177 Harris Street, S.W., Atlanta, Ga.

ADEQUATE WIRING SERVES AND SAVES

WIREMOLD *Your* BUSINESS BUILDER

THE WIREMOLD COMPANY . HARTFORD, CONN.

Dealer Aids Available For Range "Exposition"

"Cash In on the Exposition" is the slogan for September and October, among utilities and independent retailers selling Hotpoint electric ranges. The Edison General Electric Appliance Company, Inc., has presented a complete fall range sales campaign for these two months, to be adapted to local conditions, by individual utilities and retailers. Called the "Cash In" campaign, the activity is planned in connection with the Modern Kitchen Bureau's nation-wide "Electric Range Exposition."

A feature of the fall program is the introduction of two new Hotpoint ranges, both priced to sell in volume. New sales promotion literature, newspaper advertising mats, window displays, posters and billboards have been made available by the Hotpoint Company especially for the Cash In Campaign, as well as a new series of one-minute dramatized radio announcements for use in connection with local programs.

During the Electric Range Exposition, Hotpoint is offering a special sales promotion package, consisting of direct-mail pieces, display material, exclusive floor traffic novelties and salesmen's helps.

When cash prizes are handed out by the Modern Kitchen Bureau for the best dealer windows featuring electric water heaters, from September 1 to October 31, any dealer whose winning window features Hotpoint water heaters exclusively will receive a duplicate cash award from the Edison General Electric Appliance Co., Inc.

G-E Wholesale Salesmen Win World Fair Trips

Beginning August 14, more than 100 G-E wholesale salesmen, officially known as "Sales Counselors," will receive their prizes of a 4 day convention-vacation at the swanky Westchester Country Club, Rye, New York.

These Sales Counselors, coming from all over the United States, will be the guests of the Appliance and Merchandise Department, General Electric Company, in reward for their outstanding sales leadership during the first six months of 1939.

The winning of one of these trips to famous Westchester and the World's Fair was really something. In order to qualify, all Sales Counselors had to do a quota job on from 5 to 7 lines of G-E major appliances. These included commercial and domestic refrigeration, ranges, water heaters, electric sinks and kitchen cabinets, home laundry equipment, vacuum cleaners, and radios. If a man fell down only a little below the quota on one single line, he was out of luck.

Among the winners from the South were: J. R. Bates, Dallas; C. Canedy, Houston; L. A. Coleman, Washington, D. C.; J. M. Craig, Greenwood, S. C.; A. R. Davis, Houston; J. W. Detchen, Louisville; F. E. King, Oklahoma City; R. M. Lawler, San Antonio; R. W. Martin, Lexington, N. C.; E. V. McNeese, Dallas; W. H. Morrison, Asheville, N. C.; J. B. Noyes, Wheeling, W. Va.; R. L. Smith, Atlanta; K. F. Stutz, Lexington, Ky.; and C. E. Thoma, Charleston, W. Va.

News About People

The resignation of **Henry W. Burritt** as vice-president in charge of sales of the Kelvinator Division of Nash-Kelvinator Corporation was announced early in August by George

Henry W. Burritt

Frank R. Pierce

W. Mason, president. Mr. Burritt is resigning, he said, to assume the presidency and general managership of the Eureka Vacuum Cleaner Company, in Detroit.

Frank R. Pierce, former manager of the household sales division of General Motors Frigidaire, has been appointed as general sales manager of the Kelvinator Division to succeed Mr. Burritt.

* * *

Charles R. D'Olive has been appointed as manager of the Stewart-Warner household appliance division, according to announcement by F. A.

Charles R. D'Olive

Hiter, vice-president and general sales manager. He succeeds **J. F. Ditzell,** resigned. In his new position, Mr. D'Olive will supervise all phases of Stewart-Warner household appliances, including sales, merchandising, and engineering.

* * *

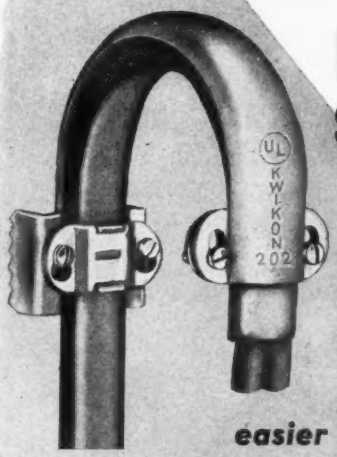
Appointment of **Tom Turner** as manager of the Meter Division at Newark, N. J., to succeed the late Ralph M. Rumbel, was announced recently by George H. Bucher, president of the Westinghouse Electric and Manufacturing Company. Mr. Turner has been associated with the Westinghouse organization since 1922.

* * *

Under the provisions of a new merchandising program, **N. G. O'Hara,** vice-president in charge of sales of all Norge household appliances has been given new responsibilities. In his position, Mr. O'Hara will direct the entire sales activities of the Norge Division of Borg-Warner Corporattion. He has been associated with

N. G. O'Hara

HERE IS REAL ECONOMY . . . . .



KWIKON No. 202
Service Cable Head
AT ONLY
20c EACH
IN LOTS OF 50 OR MORE
costs fully 25% less . . .
easier to install . . . faster . . .

Kwikon No. 202 effects real savings for you . . . because its initial cost is much lower than other Heads. You save considerably on wiring time, too, because it can be installed easier and faster. Net result—a fine appearing installation that costs you far less!

One Head takes all cable sizes. Approved and listed by Underwriters' Laboratories, Inc.

Stocked by most wholesalers; but if yours does not yet have them send your order to us with his name.

KWIKON CO. 626 W. JACKSON CHICAGO, ILLINOIS

James A. Sterling

Norge since 1930 when he came from the United States Rubber Company. He has been closely associated with Norge distributors and dealers during the past nine years.

Working directly under Mr. O'Hara will be **James A. Sterling,** who becomes general merchandise manager and is charged with the responsibility of directing merchandising plans for all Norge products, thus centralizing sales, advertising and sales promotion direction. Mr. Sterling has directed Norge advertising and sales promotion for the past nine years.

* * *

S. W. Sharbrough has been appointed agent for Electrunite Steeltubes and Fretz-Moon conduit for the state of Texas by Steel & Tubes, Inc., Republic Steel Corporation subsidiary. He will be located at 2427 South Ewing Avenue, Dallas, Texas, and will also represent the Thomas & Betts Company of Elizabeth, New Jersey, in connection with fittings and accessories for use with these two products.

Mr. Sharbrough has been associated with the electrical business since 1919. He covered several southern states as a salesman for the electrical department of Riechman-Crosby Company, Memphis, and served as a salesman for five years for the Electrical Supply Company, New Orleans. He has also been associated with the Wesco Products Company, of Chicago, and the Arrow Hart and Hegeman Electric Company in Houston, Texas.

* * *

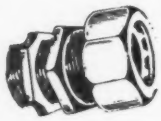
W. E. Kercheval will be in charge of a new branch office of the Allis-Chalmers Manufacturing Company which has been established in the U. S. Trust Building at Louisville, Ky.

Allis-Chalmers Mfg. Company's district office at Chattanooga, Tennessee, of which **D. S. Kerr** is manager, has been moved and is now located in the Chattanooga Bank Building, 737 Market Street.

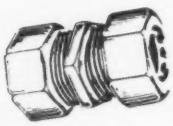
* * *

Manley E. Lord has been appointed manager of General Electric's Fort Wayne works to succeed **Neil Currie, Jr.,** who leaves that position to become assistant to the vice president in charge of manufacturing.

These Approved
CONNECTORS



and
COUPLINGS



for
THIN WALL CONDUIT
(U. S. Pat. No. 2158757)
are
ACTUALLY WATERTIGHT

Tested and Approved by
Underwriters Laboratories, Inc.

Write for latest Catalog of
CONDUIT FITTINGS
CONNECTORS
BOX COVERS
SWITCH PLATES

The Accepted © *"Mark of Quality"*

UNION MADE BY
SKILLED CRAFTSMEN

These Quality Fittings
Cost No More

Sold through Wholesalers
CONDUIT FITTINGS
CORPORATION
6400 W. 66th St. Chicago, Ill.

New Westinghouse Washer

An electric washer that actually watches itself in addition to having a fully skirted streamlined design has been introduced by the Westinghouse Electric and Manufacturing Company, Mansfield, Ohio. Designated as the Emperor, this is the first model announced in the 1940 Westinghouse line. A new time dial that shuts off the washer automatically at the end of a predetermined period eliminates all guessing and clockwatching in the operation of this model.

Additional innovations include the Select-O-Press and automatic roll stop that have been added to promote additional efficiency in the 1940 Westinghouse washer. The Select-O-Press provides the right pressure for every fabric. The automatic roll stop actually stops the wringer rolls in a split second by means of a trigger action that will operate from the slightest touch of the finger.

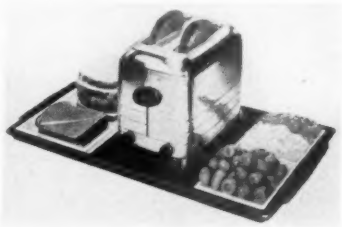
Arvin Circulating Heaters

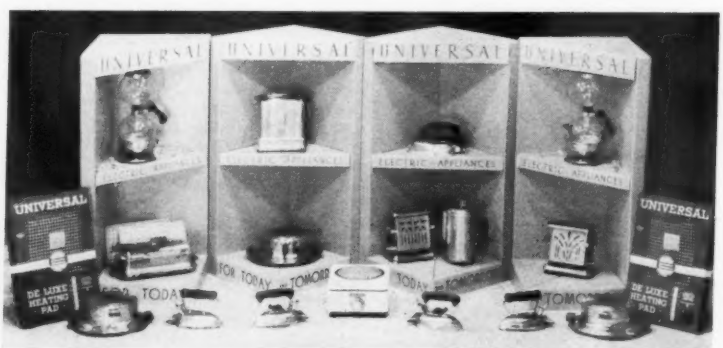
Completely redesigned this year is the Arvin line of circulating heaters manufactured by Noblitt-Sparks Industries, Inc., Columbus, Indiana. The new line includes four models priced to retail from $4.95 to $9.95, slightly higher in Denver and west and extreme South. Two deluxe models are identical except for finish. The higher priced heater is finished in ivory and maroon enamel with chromium grille. The other model is in tan and brown morocco with chromium grille. Both models have toe switch control which makes it easy and convenient to turn heaters on and off. A red indicator light shows when heaters are turned on and warns against leaving them on when not desired.

The two lower priced Arvins employ the same efficient principles of heat circulation and distribution as the deluxe models. They differ only in size, finish and features. These models are offered in two tone green enamel and green morocco.

Double Automatic Toaster

Proctor Electric Company, Philadelphia, manufacturers of Proctor electric appliances, is introducing an extremely practical and beautifully styled toaster. It toasts two slices evenly on both sides and may be adjusted to make toast to suit the taste. Feather touch control raises the toast quietly when wanted.





This attractive small appliance window display featuring the Universal line is being made available to dealers by the Landers, Frary and Clark Co., of New Britain, Conn.

Apex 1940 Washer

Two striking beauties are shown here. Miss Marilyn Meseke, "Miss America" for 1938, is presenting to "Mrs. America" everywhere the new 1940 Apex Speedliner washer. Designed by Henry Dreyfuss, famous

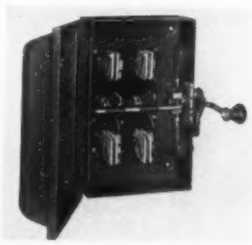
commercial designer, the graceful lines of the washer blend harmoniously with those of the beauty queen.

The model is all white, of bonderized finish, and chip proof. It has a large-size three vane cast aluminum spiral dasher. A 22-gallon tub capacity permits washing of ten pounds of clothes in six to eight minutes.

The wringer is the new design Apex-Lovell model. Fingertip control lever assures positive instant operation.

Double Throw Switches

A new line of unfused type A double throw switches has been announced by the Square D Company, Detroit, Mich. This line of switches is made in full type A construction having quick make and break, cover



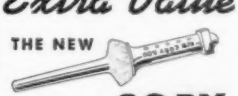
interlock, and padlocking divisions for three padlocks in the off and both on positions.

Switches are of unit base construction and have the new V-type blade, multi-spring jaws, and the compression spring construction of the Square D mechanism. Switches now in production include 60, 100 and 200 ampere sizes, both 2 and 3 pole. All sizes are listed with the Underwriters' Laboratories for either 230 volt or 575 volt a-c as well as 250 volts d-c.

Plain Hoss Sense
+ good basic quality
+ up-to-date design
= SUPERIOR
REG. U. S. PAT. OFF.
★ ★ PRODUCTS
THE SUPERIOR SWITCHBOARD & DEVICES CO.
CANTON, OHIO
★ Manufacturing ★
METER & RELAY TEST SWITCHES
METER & TRANSFORMER ENCLOSURES
METER TEST BLOCKS & TABLES

Streamlined Beauty! Easier to Clean!
★
LOWER CENTER OF GRAVITY!
THE CORY COFFEE BREWER
MARVELOUS TEA AND COFFEE UNTOUCHED BY METAL

New Models! Long Wanted Features!
Sensational NEW CORY Features are: Wider Decanter Neck (almost 3 in. across) for easy washing. Lower center of gravity! Matched fittings in Ivory-tone or Black bakelite. Every CORY Brewer offers these features: Two great filters; Bakelite Funnel Holder; Easy-grip handle; Bakelite Measuring Cup; Hinged Decanter Cover; Formed Pouring Lip. Many of the models are platinum decorated. All electric units are 2-Heat (Hi-Low). All glass is by CORNING. *Write today for latest catalog.*
BOTH CORY FILTERS (shown at right) ARE FAST
In making coffee, both limit contact of water and grounds to a short contact. Only the delicious, rich coffee flavor is extracted, untouched by metal. CORY Glass Filter ROD brews delicious tea, clear as amber, every cup the same.
GLASS COFFEE BREWER CORP.
325 NO. WELLS STREET • CHICAGO • ILLINOIS
Extra Value
THE NEW



CORY
GLASS FILTER ROD
IN ADDITION TO FAMOUS "FAST-FLO" FILTER

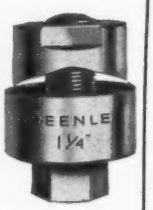
Greenlee TOOLS

TIMESAVERS and PROFIT-MAKERS FOR THE CONTRACTOR

Conduit Benders

Greenlee Hydraulic Conduit and Pipe Benders are timesavers, because they bend faster than by other hand methods. In addition, they make smooth, even bends, making it easy to pull in wire and cable.

Knockout Tools



Greenlee Punches and Cutters make it easy to enlarge holes in switch boxes, cabinets etc. They form clean-cut holes quickly and accurately, without reaming or filling.

Our new Catalog, No. 31E, illustrates and describes these tools, as well as many others of interest. If you do not have a copy, send for one now.

GREENLEE TOOL CO.
1707 Columbia Ave.
ROCKFORD ILLINOIS

GREENLEE TOOL CO., 1707 Columbia Ave.
Rockford, Illinois

Would like information on _____

_____

☐ Please send a copy of Catalog No. 31E.

Name _____

Street _____

City and State _____

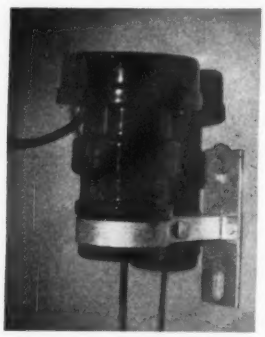
My jobber is _____ ES-9-39

All-Rubber Lampholders

A new small, inexpensive all-rubber weatherproof lampholder has been announced by the General Electric appliance and merchandising department, Bridgeport, Conn. The all-rubber jacket of the lampholder is equipped with a shadeholder groove and the tinned screw shell is enclosed in the jacket in such a way that it can neither turn nor come loose. There are no rivets to become loosened and no pitch or cement to crack. Six-inch rubber leads supply the current directly to contacts.

New Lightning Arrester

An improved form of the familiar "LV" lightning arrester device for protecting power distribution systems from lightning has been announced by the Westinghouse Electric & Manufacturing Company. Several important changes have been made resulting in superior protective performance and characteristics that are particularly beneficial on rural-type circuits where the ground resistance is above average, where transformers are small and widely separated, and where the line insulation is high.



Among the important improvements built into the new arrester is a change in the blocks or valves giving a great increase in surge-current capacity. An entirely new insulating coating for the sides of the blocks reduces the external flashover and special terminal plate improves the uniformity of performance. The new arrester is at present available for distribution circuits whose maximum line to ground voltages are 3000, 6000, or 9000 volts.

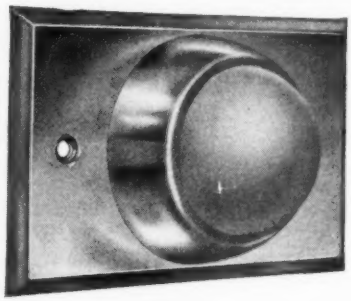
Lamp Lowering Hangers

A new catalog of lamp lowering hangers, lamp shock absorbers, and other accessories, has just been issued by the Thompson Electric Company of Cleveland, Ohio. Although Thompson lamp lowering hangers have been in use for more than 25 years, the entire line of hangers, shock absorbers, suspension fittings and related accessories, has been redesigned. New models and new accessories have been added to obtain not only better performance and longer life, but to broaden the field of application.

Another new development described on page 24 of the new catalog is a unit package. It is intended primarily for service station and industrial yard installations, and saves the customer all the trouble of shopping around for pulleys, clamps, chains, etc. Copies of the new catalog, No. 39, may be obtained by writing the Thompson Electric Company.

Glow Lamp Receptacle

A new recessed-lamp receptacle, designed for use with neon or argon glow lamps made by the General Electric Vapor Lamp Company, Hoboken, N. J., greatly increases the utility of these lamps. This unit is streamlined to the lamp in such a way that the exposed portion of the lamp bulb has the appearance of a

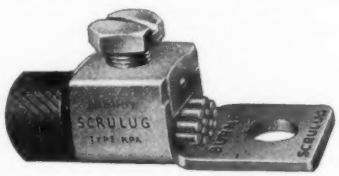


lens. This optical deception is said to be of particular value in plants where theft of lamps is encountered.

The complete unit is made in two models, one for switch plate mounting and the other for single-hold mounting on a panel. Each of these models contains the standard approved screw base socket permitting glow lamps of different wattages to be used.

Burndy Electrical Terminal

A new terminal connector designed to accommodate a range of wire or cable sizes is announced by the Burndy Engineering Co., Inc., New York, N. Y. The connector features a one piece assembly which eliminates the possibility of loose parts becoming lost. The pressure strip prevents the clamping screw



from damaging the conductor. The entire connector is tinned to prevent corrosion and discoloration. As listed by the Underwriters, the new connector is made for all conductor sizes from No. 14 to 4/0.

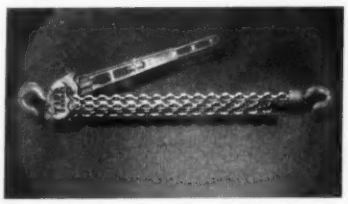
The Burndy Engineering Company also announces a new catalog ready for distribution. Designated as No. 21, this is a condensed industrial catalog on electrical connectors. It prevents a wide range of Burndy connectors in copper and aluminum for cable, tube, wire, bar and rod.

New Kolton Bulletin

The Kolton Electric Manufacturing Company of Newark, N. J., has just issued its bulletin "C-2" describing and listing its lines of cartridge and plug cutouts, slate fuse blocks, dead front cutout covers and neutral blocks. Copies of this bulletin will be mailed to any one in the trade upon request.

Spur Geared Puller

The Tips Tugger is a new light weight, spur geared puller with ratchet handle and a friction brake that holds the load securely at any point. Forty-three pounds of pressure on the tugger will lift a capacity load of ¾ ton. All working parts of the mechanism and brake are fully enclosed and protected in a dust proof, grease tight housing.



Mechanism and bearings are packed with grease at the factory and sealed so that no additional lubrication is necessary during the life of the tugger. Button control permits free wheeling for easy connections. Further information on the tugger may be obtained from the Tips Tool Division of A. B. Chance Co., Centralia, Mo.

Application of Oil Separators

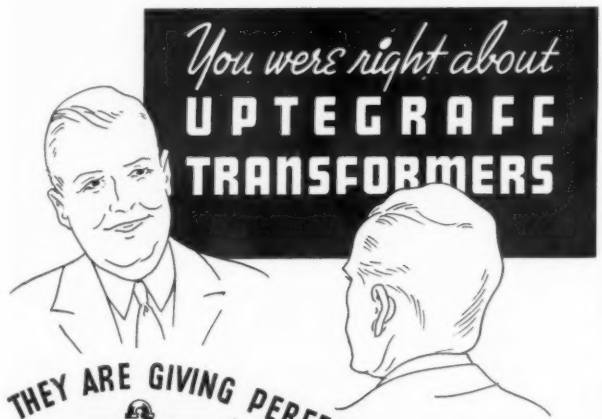
(*Continued from page* 46)

a definite place for this device in the every day service problems encountered by service engineers. It can be the answer to some of the most aggravating service problems. For example, it presents practically the only solution to such problems as high head pressure resulting from oil accumulating in the condenser, or low officiency of cooling coils and expansion valves because of oil in the refrigerant, etc. It is a method of providing better service that a customer will pay for willingly.

However, efficient operation of an oil separator depends to a large extent upon proper application. If perfect separation is to be accomplished, the service engineer must remember that there is a definite relation between the compressor capacity and the volumetric capacity of the separator. Oil is separated from the oil laden gas by bringing it into contact with some surface. In oil separators the surface is made up of plates, baffles, or metallic wool and there must be an adequate surface in the separator if no gas is to pass through without coming in contact with the surface. If adequate capacity is provided in the separator, almost 100 per cent oil separation can be obtained.

But what if the separator is too large for a particular installation? Then there is a possibility of the refrigerant condensing in it and being returned to the crankcase along with the oil. Naturally, this would result in a loss of capacity from the equipment because the liquid gas in the crankcase would expand and raise the back pressure or load to be done by the compressor. Correct sizes of separators for various units can be determined best by reference to the manufacturers' recommendations.

It is interesting to note that practically all of the better refrigeration jobbers are now stocking oil separators for both large and small units. Every service



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and perfect performance comes only from "Quality and Service" designed and built into Transformers—all in strict accordance with the rigid requirements of NEMA and AIEE.

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R. E. UPTEGRAFF Manufacturing Co.
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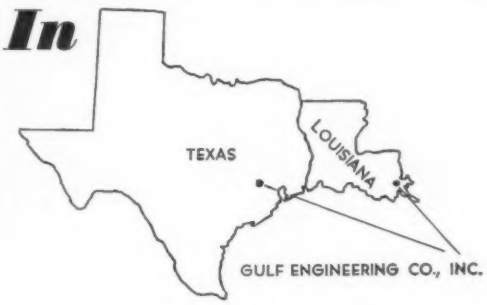
In



In the States of Texas and Louisiana, stocks of DOLPH'S Insulating Varnishes and Compounds are carried by the Gulf Engineering Company, Inc., 7014 Navigation Boulevard, Houston and at 916-30 S. Peters Street, New Orleans. These stocks are maintained in order to provide better service for our many customers in these territories.

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JOHN C. DOLPH CO.

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166 Emmett Street **Newark, N. J.**

engineer who is not already familiar with the better service and new business that can be developed through proper application of this device will do well to investigate it further.

Diagrams for Lap Wound Motors

(*Continued from page* 43)

monly used. The others can be made up as required.

There is another way in which the pole phase group marking can be used by experienced winders and trouble men that work on outside jobs, and that is the group markings can be copied in a note or data books, and used in that form, or a diagram made in the field from the data, as explained in the following:

For example, consider Fig. 7. We could mark the note book "4 pole, 2 phase, dual voltage, 8 leads: (1)-A1-L5, (2)-B1-L-6, (3)-A2-L7, (4)-B2-L8, (5)-A1-L5, (6)-B1-L6, (7)-A2-L7, (8)-B2-L8. Thus in a few short lines we have a complicated connecting diagram.

In writing out the groups, the first number is always the group number or (1), (2), etc.; then the next will be the top lead symbol, and the last the bottom lead marking. Always use three markings for each group and in the order given and there will be no trouble experienced with confused markings. Use an (*) for all star connection to indicate the common point.

Include in the note book the notes on how to arrange the line leads of the dual voltage diagrams, that is, three small tables: one for 2 phase, one for 3 phase star, and one for 3 phase delta, as in Figs. 7, 8, and 9.

In making up the note book, it might be advisable to segregate the diagrams into groups as first all 2 phase, then all 3 phase star, then all 3 phase delta. Then divide each section into pole grouping or 4, 6, 8, etc. This will make it easy to locate the requiring connecting diagram with the least effort.

It will pay to study the pole phase group markings used with these diagrams as it reduces a complicated subject to a very simple system.

The next article will present the single voltage, four parallel connection diagrams, Figures 10, 11 and 12, and will also explain the small sketches used in the center of each diagram.

Reader Comment

(*Continued from page* 42)

prompt payment of commissions is the best incentive to good work on their part.

We pay a straight 10%, payable on the first and fifteenth of each month. We deduct 10% of these commissions until a reserve of $50 is accumulated for each man; then deductions cease until, by reason of some charges against the reserve due to repossessions, they must begin again to build the reserve back up. This, to our mind, clears the decks completely of the unsatisfactory deal, and we then put the reposessed merchandise back in stock, where any salesman can sell it and get the regular commission on it. To add an incentive to get the salesmen's cooperation in moving the repossessed merchandise, we give a longer commission on used merchandise, paying 25% on used radios, ranges and washers, and 15% on used refrigerators. Since the original purchaser, before defaulting, has usually paid something in a down payment and a couple of monthly payments, the dealer's investment in the article is reduced, and he can afford to give the salesman a break in moving it.

We do try to accumulate a "nest-egg" for the men but do it in the form of an extra bonus, rather than taking it out of their regular earnings. Each salesman whose yearly gross equals or exceeds $15,000 receives a bonus of ½ of one per cent, or $75, on $15,000 worth of business. This is paid at the end of the year, and furnishes sufficient stimulus to keep the men active during all seasons.

Phil Freedman
Oklahoma Tire & Supply Co.
Oklahoma City, Oklahoma.

Understanding and Using the Code

(*Continued from page* 36)

It must be remembered that two additional types of branch circuits are available for non-residential building, the 35 and 50 ampere branches. As was pointed out in a previous discussion the use of these heavy duty lighting circuits as in the case of the 20 and 25 ampere circuits preclude the installation of individual medium base lampholders. Also it will be found that in many cases the installation of several smaller branch circuits rather than one large branch circuit will save both on labor and on material costs.

Experience has shown that circuits having a continuous load cannot be loaded to capacity. Standards of material and construction are based on ideal laboratory tests which are not simulated in actual installations. It has been found that branch circuits loaded to a maximum of 80% of capacity will give more satisfactory and more reliable operating results if these circuits are to carry their load continuously for several hours. This rule is stated as a definite requirement in section 2108 and must not be overlooked in establishing the branch circuit rating of commercial wiring systems.

The 150 and 300 watt lamps have medium base holders and, therefore, must be installed on 15 ampere branch circuits. The 500 watt units may be installed on any one of the five types of branches. All circuits must be derated 20%

since the load is continuous, i.e., the 15 ampere branch circuit can be loaded to only .8 x 15 or 12 amperes and similarly the 20 ampere branch may carry only 16 amperes, the 25 and only 20 amperes, the 35 only 28 amperes, and the 50 only 40 amperes.

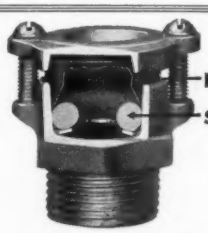
The actual design of the branch circuits for the store shown in Figure 17 will illustrate these rules and calculations. Each show window has thirty-two, 300 watt lamps. Section 2107b states that each of these medium base lampholders must be assumed to carry a minimum load of 1 1/2 amperes. However, each outlet will supply a 300 watt lamp or approximately a 3 ampere load. Since we are limited to the use of a 15 ampere branch circuit only a total load of 12 amperes may be installed on each circuit. Therefore, only four lamps may be installed on each branch circuit, viz., 4 x 3 ampere is equal to a total load of 12 amperes.

Each window will require 32/4 or eight 15 ampere branch circuits. Depending on where the branch circuit distribution cabinet will be placed it may be necessary to install No. 12 wire instead of No. 14 to keep the voltage drop to a minimum. However, the maximum fusing must still be kept to 15 amperes on these higher capacity lines. This, of course, is an engineering problem to be solved by the contractor for each individual installation.

There are twenty-four 500 watt units on the main sale floor. Any one of the five types of branch circuits may be utilized. Assuming four lamps to a circuit the total load will be 2000 watts or approximately 20 amperes. Twenty-five ampere branch circuits with a minimum of No. 10 wire will be installed. It is important to keep in mind that the 15, 20 and 25 ampere branch circuits may be controlled from a standard branch circuit distribution cabinet. The two heavy duty types of branches will require special 60 ampere branch blocks to be installed in the distribution cabinet.

The back portion of the main floor and the mezzanine will require twenty-four 150 watt lamps. Each lamp draws approximately 1 1/2 amperes so that the minimum rating set up in Section 2107b may be applied to each outlet. Again we are limited to the use of the 15 ampere branch circuit so that a maximum of 10 lamps may be installed on each branch. Twenty-four lamps will require three circuits and to properly balance the loading on each circuit, 24/3 or 8 lamps will be installed on each branch. This will allow for a future installation of two more outlets on each of these circuits.

If the show window units had mogul base outlets each unit would then have to be rated at 5 amperes although the actual *present* load is only 300 watt lamps in each lamp holder. This particular question was the subject of official NEC Interpretation No. 151 published in the March IAEI *News Bulletin*. Lighting illumination levels are not by any means at a maximum value. Higher and more adequate foot candle illumination will be produced as rapidly as it is humanly possible to supply more comfortable and more practicable sources of high intensity lighting. For this reason, very often circuits are easily overloaded by replacing the smaller lamps with



THE Jobber, who is looking for a quality line of ground clamps, entrance service cable connectors, cable straps, service heads, ground rods, will find the M & W products, a fast moving line to stock.

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larger units. A 500 watt lamp may easily replace a 300 watt lamp in the average lighting unit being manufactured today.

As a passing word let it be emphasized again that the code supplies a minimum standard. Throughout the discussions on branch circuit wiring it has been attempted to point out most forcibly that each installation will require some thought, some ingenuity and some engineering on the part of the contractor if he is to adequately take care of the consumers needs and wants.

Trailer Facilitates Substation Maintenance

(*Continued from page* 38)

ment to a transformer or circuit breaker tank, it is only necessary to unreel the needed amount of hose and connect it to the tank.

Quick opening valves are provided on the end of each length of hose in order to quickly stop or start the flow of oil and to minimize waste or loss of oil when connecting or disconnecting. All motors and heater units of the purifying equipment are controlled by means of push button stations mounted at the machine and an additional push button station is connected in series with the push button controlling the oil pumps by means of a long extension cord which may be carried into the substation to the equipment being worked upon.

A small, totally enclosed steel work bench is mounted in the center of the trailer, directly in front of the two side doors. On the top of the work bench is fastened a small bench vise, a pipe vise, and a drill stand with a portable electric drill. In the lower part of the work bench is a drawer for bench tools and drill bits, and a compartment for pipe cutters, pipe wrenches, dies, etc. Small hand tools, such as pliers, wrenches, screw-drivers, and a large assortment of socket wrenches are carried in wood trays which are recessed to fit the tools. These trays are mounted in a cabinet in the front of the body, and may be removed and carried to any place where needed.

A complete spray equipment is carried in one of the lockers, as well as several lengths of air hose, and a small air hammer. The compressor furnishes the air supply necessary to operate the spray gun or hammer, and the air is also utilized for cleaning or blowing dirt out of substation apparatus.

Spare equipment such as oil valves, thermometers, oil level gauges, oil circuit breaker parts, gaskets and sheet gasket material, and an assortment of pipe connections, nipples, bolts, nuts, etc., are carried in the stock bins in the trailer. A full assortment of paint is also carried in the trailer.

Provision is made to carry the pole derrick and three section, thirty foot extension ladder on specially designed rollers in the top of the trailer body. Access is gained to this equipment by means of a small, horizontally opening door immediately above the rear door of the body.

The watthour and oil meter are provided so that the quantity of oil handled and the amount of energy consumed may be obtained for the purpose of determining unit operating costs of the work performed.

This equipment has now been in service slightly over two months on this property, and is amply fulfilling all expectations. In actual field work, the oil purifier is usually connected to one piece of substation equipment, and when started, will operate with very little attention, thus leaving the operators free to carry on circuit breaker inspection, cleaning and painting of equipment, or other work. The pole derrick and winch is used to remove transformer cores from tanks so that sludge may be completely removed from the interior of the transformer, and is also used in moving equipment.

The new trailer unit with the associated equipment has not been in service long enough to obtain any true cost comparisons. However, since the trailer formerly used was a four-wheel unit with approximately the same amount of load, we know that the operating cost of the truck and the new semi-trailer will be less. The new oil filtering equipment, which was installed, has a rated capacity twice that of the old machine. This increased capacity has decreased the total cost per gallon of reconditioning insulating oil.

Due to the increased size and capacity of the new trailer, ma-

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terial and equipment are carried to do maintenance work which previously required the use of a special crew of men with attendant additional expense. The numerous advantages of the new equipment will result in a definite decreased substation maintenance expense.

More Adequacy In Wiring

(*Continued from page* 33)

possibilities of thin-wall insulated conductors, uninsulated neutrals and increased conduit fills in increasing copper capacities in existing ½" branch circuit conduits of commercial and industrial buildings.

It is desirable to clear up several points which have been subject to misinterpretation. The recommendation covering the uninsulated neutral was carefully restricted on the basis of engineering research to use in rigid steel conduit and steel electrical metallic tubing. Since grounding is important, it is not to be used except on alternating current circuits of not over 150 volts to ground and where connection is made to a continuous underground water piping system. Investigations indicate that under these conditions the practice is safe and will cause no trouble.

The proposal for the use of thin-wall insulated conductors and for increased conduit fills is intended entirely for the rewiring of existing buildings. Although one influential group on the Code Committee has proposed a change in the conduit fills of Table 2, Chapter 9, so that advantage may be taken of the reduced diameter of building wire in new construction with a reduction in conduit sizes, the Electric Light and Power Group is firmly opposed to any change in the requirements of this table for new work. Just as the Code demands certain minimum copper sizes in services and feeders, even though the initial load may not require such capacity, so it is believed that in the general wiring of new buildings with rigid raceways, provision should be made for the future by maintaining the general conduit fill table as now written. This is a safety measure based on present experience and is justified on that basis.

Will these new processes build business? It is believed that they will. Some millions of feet of covered neutral cable have been used in over 6,000 installations of which there is definite record. The reports from cities where promotion of this material has actively been undertaken indicate that due to the impetus given, more outlets and more branch circuits are being installed per job than was the case when other materials were used.

The story of the complete rewiring job appearing in the EEI booklet "The Commercial and Industrial Building Rewiring Market" (Appendix 2) shows the large volume of business that is there and to be had in rewiring commercial buildings. When branch circuit capacities are substantially increased it usually becomes apparent that existing feeders and panelboards are too small and must also be changed. This may require an increase in the main distribution equipment and the service. Transformer changes may be involved. At the same time, the

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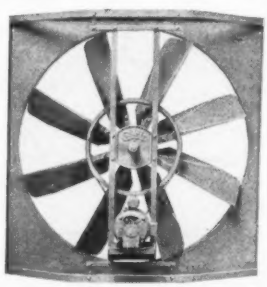

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net cost of the complete job to the customer is such that he feels justified in going ahead with the plans, whereas under existing wiring methods he is disposed to postpone the changes or to proceed with only a small part of them.

Utility groups are planning active and aggressive promotion of wiring with these new materials. They fully expect that results in increased volume of wiring business obtained during the coming years will supply the conclusive answer to the question "How are these changes going to affect the wiring industry?"

Code Changes Proposed by EEI

(*Continued from page* 26)

proposal has been made that conduit fill of 75% of the net available area be permitted for rewiring installations. The net available area does not mean the total area of the interior of the conduit, but the geometrically possible area for the particular number of conductors involved. The geometric limitations are as follows:

No. of Conductors	Maximum Usable Area	75% of Maximum
1	100%	75%
2	50	37.5
3	64.7	48.5
4	69	51.8
5	68.5	51.4
6	66.6	50
7	77.8	58.3

Actually this proposal would permit, for rewiring only, a conduit fill of about 50%. This increase of 25% allows for considerable increase in capacity where it is combined with thin-wall insulation and bare neutral.

The combined use of increased conduit fill, thin-wall insulation and bare neutral will permit a two, three or even more times increase in the current carrying capacity of existing conduits. Figure 3 is an example of the supply of 12,696 watts in a ½" conduit against a common arrangement where only 3450 watts can be supplied. This type of wiring installation is also readily adaptable to the three-phase four-wire 120/208 volt distribution system which is becoming more and more common throughout the business areas of the cities of this country.

(6) Recognition of service cable of the covered neutral type for general indoor use

Service cable has been used for a number of years for range supply as well as the service entrance itself. These applications have been entirely successful and the extension of the use of service entrance cables to other heavy duty appliances and to distribution panels within the building appears to offer no additional factor as far as safety is concerned, and considerable advantage for certain situations.

(7) Removal of requirement for mandatory use of rigid conduit in theaters, elevators and hazardous locations and of metal-clad wiring in garages

The provision of the Code which requires the use of rigid conduit in all theatres, elevators and hazardous locations and of metal clad wiring in garages is very sweeping. Such types of wiring are suited to the urban theatre, to commercial garages and similar buildings, but less expensive types of wiring are equally safe and better suited to the country cinema theatre of frame construction, for instance, and to private garages. The requirement for rigid conduit wiring in such buildings results in a skimping of the permanent wiring and the habitual use of long extension cords. It should be borne in mind that the proposal made relates only to the removal from the Code of a blanket rule. The Code in other more specific provisions takes care of all the safety considerations the blanket rule affects.

(8) Deletion of rule requiring conduit to be shipped in 10-ft. lengths

For many years there has been a requirement in the Code that conduit be shipped in 10-ft. lengths. This 10-ft. requirement does not appear to be involved in safety, although it has in the past probably been useful and suitable for ordinary stocking of conduits as commercial articles. However, with increased requirements for outlets, particularly in large buildings, there appears to be substantial advantage in obtaining special lengths of conduit.

For instance, a building laid out with 9-ft. centers between outlets, now means that 10% of the conduit must be wasted. In a large building of this character great saving could be effected by purchasing large quantities of material of the required length. It might be 7 ft., 9 ft., or even 12 ft. The lengths obtained would be based on the economy of the specific situation and not on a standard length for general stocking.

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Unusual Importance Attached to Meeting

(*Continued from page* 20)

the report of the rubber-covered wire manufacturers committee which has been working for some five years on the problem of conductor carrying capacities, will not only be of interest but one of far-reaching import to every one in the electrical business.

The newly developed thin-wall rubber insulation and the code recognition of asbestos and a combination of asbestos and cambric insulation, will present phases in the development of the industry with which all concerned will want to be intimately acquainted.

The general proposals put forward by the utility group which have as their basic intent the expansion in the use of electricity, are of major importance to each and every branch of the industry.

The meeting of the Southern Section, as well as the other Sections of the International Association of Electrical Inspectors, are unusual in their scope. While primarily a meeting of code-enforcing authorities, the IAEI includes in its membership all branches of the industry and their representatives are welcome at the sessions and are free to comment on the subjects under discussion.

While most of the groups of the electrical industry have their own organizations, it has been frequently stated that the meetings of the IAEI offer the best opportunity to discuss the National Electrical Code.

Bank Lighting Reflects Warmth and Hospitality

(*Continued from page* 15)

indicates which teller needs assistance. Electric reset button is at the president's desk, to turn out the "bull's-eyes."

A feature of the Hillcrest Bank that is truly modern and is appreciated by depositors is the outside teller's cage at rear of building. Here the motorist can do his or her banking without leaving the driver's seat of the car. The revolving base of the window, to bring in a deposit or pass out money, is controlled only by the teller behind stout bars.

Stimulating Interest In School Relighting

(*Continued from page* 16)

furnished a real inspiration, especially to the Parent-Teacher Associations which have proceeded to raise money to so equip other rooms."

In some of the installations it has been necessary to change the wiring so as not to overload circuits as well as to provide the desired outlets.

One of the school rooms in which model illumination was installed adopted the subject of lighting for study throughout the term. The pupils learned about man's first experience with fire, with candle light, and with lighting by electricity. Geography, English, arithmetic, literature, spelling and other courses were related to this one.

Manual training classes in the schools during the past term specialized in making table lamps and other decorative light fixtures.

The Birmingham Electric Company cooperated by furnishing an armful of blue prints to the pupils, as well as actual specimens.

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CARLING DINKLER, President and General Manager
OPERATING 3000 ROOMS IN SOUTHERN HOTELS

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SIGNAL ELECTRIC MFG. CO.
Menominee, Michigan
Branch offices: Atlanta, Ga.— V. E. Hopper, 357-59 Marietta, St.—Dallas, Texas — Geo. E. Anderson, Santa Fe Bldg.

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